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CHRONIC CONSTIPATION

AND ALLIED CONDITIONS

PATHOLOGY, ETIOLOGY, DIAGNOSIS
AND
TREATMENT

BY

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To
ANGUS McLEAN, M. D.,
In appreciation of what he has accomplished in sur-
gery, and what he stands for in the medical
profession; this work is respect-
fully dedicated by the
AUTHOR.

PREFACE.

It is a well-known fact that none but the mildest cases of chronic constipation can be treated successfully by medication alone, but it is not so well known by the medical profession that it is amenable to treatment by *mechanical agents*.

It is the object of this treatise to describe the various measures now in use, and particularly to give in detail an account of a reliable method, easy of application, and effective.

The anatomy, physiology, pathology, etc., are introduced to confirm the conclusions reached from clinical observations, and to place the mechanical method of treating chronic constipation on a rational basis.

The work is primarily the outcome of clinical experience and designed to be of interest to the general practitioner as well as to the specialist.

Some space is devoted to the subject of auto-intoxication. This pathologic process bears a peculiar and important relation to constipation. A condition prevails in a certain type of case which gives rise to a very marked toxæmia.

The ultimate test of a therapeutic agent is to be found in the results obtained from its use. Accordingly cases are reported to demonstrate the validity of the methods employed, while at the same time they illustrate certain modifications of the treatment to suit the varying conditions found in different patients.

I am indebted to Dr. F. B. Allison for valuable assistance and for making histories of cases.

I am also under obligations to Dr. J. V. White, Dr. Angus McLean, Dr. E. L. Shurly and many other members of the medical profession for much of the clinical material upon which this work is founded, and take this opportunity to express to them my gratitude.

J. A. M.

DETROIT, MICH., Feb. 1, 1908.

CONTENTS.

PREFACE.	9
INTRODUCTION	15

CHAPTER I.

ANATOMY AND PAYSIOLOGY.

The Large Bowel—The Ileocecal Valve—The Colonic Musculature—The Colon—Function of the Colon—Peristalsis—Tone—Catharsis—Chemistry of the Gastrointestinal Tract—Nothnagel's Statement—Hemmeter's Statement—Author's Experiments on Dogs—Stretching and Contraction Favors Metabolism—Spencers Generalization Some physiological Facts—Distention by Food and Waste Material—Mechanical Disturbance—Function of the lower Bowel—The External Anal Sphincter—The Internal Anal Sphincter—The Levator Anal Muscle—The Rectal Valves—Method of Examining Rectal Valves—The Blood Supply—Enervation of the Intestine—Mall's Theory—Stimulus of the Nervous System—Purgatives—The Mesocolon and Mesorectum—The Rectum.....	25
---	----

CHAPTER II.

ETIOLOGY OF CONSTIPATION.

Definition of Chronic Constipation—Not a Disease but a Symptom—Causes—The Essential Point—Infrequency of Stool—Normal Movements—Pathologic Conditions—Illoway's Classification of Diseases of which Chronic Constipation is a Symptom—Nothnagel's Grouping—Immediate Causes of Constipation—Constipation—Atony—Abnormal Irritation—Chronicity—Two Distinct Problems—Differentiating—Atony of Rectum More Prevalent in Women than in Men—Degree of Atony—Mild Cases—Severe Cases—Complete Cases—Premature Atrophies—Hypertrophies—The Mind Over Matter—About Structural Retrogression—Some Facts of The Simple	
---	--

Life"—Improper Diet—Fermentation—Putrification—
The Most Important Factors—Meat Diet—Fats—
—Vegetables—Water—Worry and Severe Mental
Work—Bodily Inactivity—Ill-Advised Use of Cathar-
tics—Intestinal neurosis—A Typical Case—Indiges-
tion—Chronic Colitis—Clinical Types of Chronic En-
teritis—Inflammation of the Cecum—Appendicitis—
Typhitis—Peritonitis—Intestinal Neoplasm.....53

CHAPTER III.

ETIOLOGY OF OBSTIPATION.

Definition of Obstipation—Causes of Partial Obstruction
—Dilatation—Valvotomy—Misplacement of the Colon
—Corsets—Belts—Attitude During Work—Peritoneal
Adhesions—Splanchnoptosis—Stricture of the Rec-
tum—Syphilis a Common Cause—Tubercular-Gonor-
rheal Ulcers—Retroflexed Uterus—Prolapsed Ovary—
Floating Kidney—Hypertrophy of the Prostate—The
Peritoneum—Constricting Bands—Partial or Com-
plete Occlusion—Acute Angulation—A Clinical Case
—Volvulus—Occlusion 97

CHAPTER IV.

ETIOLOGY OF COMPLICATED CONSTIPATION.

Pathological Conditions That Cause Constipation—De-
rangement of Circulation—Venous Hyperaemia—Ar-
terial-aemia—Cardiac Failure—Pulmonary, Hepatic,
or Nephretic Obstruction—Peritonitis—A Clinical
Case—Certain Nervous Diseases—Myelitis—Hydro-
cephalus—Meningitis—General Paresis—Neurasthe-
nia and Melancholia 110

CHAPTER V.

DIAGNOSIS.

Necessary Points in Complete Diagnosis—Sources of In-
formation—Inductive Methods of Reasoning—Peris-
taltic Test Meal—Palpation—Digital Examination—

CONTENTS.

13

The Essence of Diagnosis—Two Cases of Faulty Diagnosis—Confirmatory Proofs—Conclusiveness and Thoroughness—Ballooning of the Rectum—The Rectal Tampon—Four Facts in Diagnosis—Feces in Differential Diagnosis—Amount, Odor, Color, Consistency, Form and Constituents—Mucus in Stool—Mixed Diet—Blood in Stool—Pus in Stool—Enteroliths—Gallstones—Pancreatic Calculi—Microscopic Examination—Chemical Examination of Feces.....115

CHAPTER VI.

RECTAL EXAMINATION.

Reasons for Careful Rectal Examination—Positions for Rectal Examination—Inspection and Palpation—Extra-Anal Depression—Cord-like Condition of Sphincters—Unusual Moisture—Cutaneous Folds—Minute Round Ulcers—Relaxed Sphincter—Digital Examination of the Rectum—The Proctoscope—The Sigmoidoscope 132

CHAPTER VII.

CONSEQUENCES AND SEQUELA.

Habitual constipation—Failing Vitality—Neurasthenia—Dyspepsia—Emaciation—Chronic Colitis—Three Factors—Appendicitis 140

CHAPTER VIII.

TREATMENT OF CONSTIPATION.

Intestinal Muscular Atony—Rational Treatment—Uncomplicated Intestinal Atony—Intestinal Distention—Other Important Factors—The Removal of Intestinal Irritation—Therapeutic Use of Rectal Tampons—Size of Tampons—Methods of Packing—Length of Time Tampon Should Be Retained—The Physiological Action of Tampons—Three Important Requisites—A Suitable Diet Important—Importance of Thorough Mastication—The Importance of How and When to

Take Water—Gas in the Bowels—When a Diet is Harmful—Vegetables—Fruits—Fats 146

CHAPTER IX.

CHRONIC COLITIS.

Three Common Sources of Irritation—Cathartics in Colitis Injurious—The Only Purpose of Diet in Catarrhal Conditions—Urgent Necessity of Regulation of the Bowels—Colonic irrigation Affords Best Results—Action of the Abdominal Muscles—Methods of Improving their Activity—Cases in which Massage is Indicated 164

CHAPTER X.

TREATMENT OF OBSTIPATION.

Involves Great Diversity of Procedure—Obstructions Must be Removed—Disease of the Sphincter—Four Important Therapeutic Agents—The Most Important is Dilation—How to Dilate—Inflamed Rectal Valves—Best Therapeutic Measures 171

CHAPTER XI.

AUTO-INTOXICATION.

Self-Poisoning of the Individual—Toxines of the Intestinal Tract—As a Cause of Functional Disorders—Intestinal Prophylaxis—Aperistalsis Produces Toxemia in Three Ways—Excessive Absorption—Putrefaction—Hepatic Torpor—Auto-Intoxication to be Distinguished from Reflex Disturbances Due to Coprostasis 178

CHAPTER XII.

CLINICAL CASES.

Cases 1 to 25 216

INTRODUCTION.

Not every remedy recommended by the testimony of a long list of cures has been found worthy of confidence. A moment's consideration of the vast number of useless agents that have been offered to the medical profession in this way and have secured an extensive adoption is sufficient to demonstrate the necessity of a critical attitude on the part of every practitioner. Nevertheless, the value of statistics cannot be denied. Some of our most practical remedies stand on no other logical basis than *Argumentum per enumerationem simplicem*.

The therapeutic results obtained from some of the best medical agents cannot be explained, but the constancy with which the cures are effected is sufficient to establish them in the confidence of the profession. Not only these agents but all others, wheth-

er supported by physiological proof or not must be shown to produce therapeutic results, and their hold upon the physician's esteem depends to a very large extent upon the uniformity with which these results are obtained.

The methods and conclusions described in this treatise are founded primarily upon clinical experience. Some of the newer and more effective agents have been in use by the author for five years and their action has been under observation in about three hundred cases; the results have been such that he feels warranted in recommending them to the profession. As nearly as can be estimated, the treatment has been successful in about seventy-five per cent of these cases.

When the nature of this disease is considered it will be appreciated that this is a very gratifying result and a very high percentage of cures. The failures are accounted for in various ways; in some the responsibility rests upon the patient, who having obtained temporary relief, discontinues the treatment prematurely. Other patients permit the daily round of pleasure or routine of business to interfere to such an extent with the regimen prescribed that it is impossible to make a success of the treatment.

Then again some failures are due to errors in diagnosis; and just here it may be stated that the importance of systematic and thorough investigation of each case cannot be emphasized too strongly. Accordingly, methods of examination and of diagnosis are taken up in detail.

An obscure defect in the circulation or in the central nervous system may escape detection and frustrate the best directed effort to cure the intestinal atony. In two cases, obstipation from peritoneal adhesions was not discovered until the patient had been under treatment for chronic constipation for some time.

Such instances furnish confirmatory proof of the specific nature of the agent and do not in any way reflect discredit upon it. However, the testimony of reported cases in this disease is not comparable with that from such disease as diphtheria; in the latter the etiology and pathology are well known and the symptoms are acute and definite. The administration of anti-toxin is followed by a prompt change for the better; under such circumstances a few cases are sufficient to establish a proof of the efficacy of the remedy. Whereas chronic constipation is a condition of slow development present-

ing all degrees of severity from forms so mild that the patient is scarcely aware of any trouble, to cases in which there is fecal impaction.

Then one or more of a great variety of factors may be the primary cause, and in the milder forms when this is removed a spontaneous cure may result. Accordingly a method of treatment that purports to be a cure for this condition must not only furnish a long list of cures but must also have them subjected to careful and critical scrutiny.

The histories of cases given in this work were not designed to furnish testimony in behalf of the methods used, but to illustrate the variety of conditions to which they must be applied. It is only necessary to refer to the difficulty of obtaining reliable information concerning the subsequent history of cases. In many instances the author is indebted to the family physician for the records given. In not a few instances one patient has referred another for treatment a year or more after the former had been treated, and in this way additions have been made to case records. Such information is not only gratifying, but is probably as reliable as any at our disposal.

After the first publication upon this subject by

the author, a number of practitioners began the use of the methods described; their results correspond very closely with those given in this treatise.

Statistics alone are not sufficient; the scientific mind seeks and demands other reasons before the adoption of a therapeutic agent. It is to physiology that we must look for advancement in rational therapeutics. The remedy that can be shown to accord with the physiological factors concerned is already established. It is along this line that serum therapy has awakened an interest, and confidence, even in the face of very meager results. Accordingly the author has investigated to some extent the physiological factors that have a direct bearing upon chronic constipation with the purpose of finding to what extent the remedies in use and described in this work are sanctioned by the natural forces and functions of the structures involved. It is demonstrated that this therapeutic agent simulates with sufficient precision the normal stimulus of intestinal peristalsis, and here is the very essence of the rational treatment of intestinal atony.

In whatever way this pathological condition has been produced the agent that is best suited to its relief is a modification of the stimulus which under

normal conditions produces regular physiological peristalsis. By the method described in the treatise, the degree of stimulation may be increased, diminished or modified as to duration or location.

A remedy that does violence to the structures or disturbs or supplants the physiologic processes must in the very nature of things be defective. In fact, it is doubtful if any such agent can be of real value in disease in which derangement of function is an important feature. This view is in agreement with that of the best modern authorities in diseases of other organs, e. g., the heart, lungs, stomach, etc.

Only the physiology that has a direct bearing on the subject has been discussed in this work. The author has, in common with other clinicians, obtained the data upon which to establish a rational treatment, from the physiological laboratories. However, some experimental work has been done by the author in order to demonstrate and verify the more pertinent physiological facts. It will be seen that these experiments corroborate in a very remarkable manner both the physiological principle and its application.

The efficiency of any therapeutic agent in the relief of chronic constipation depends upon the fa-

cility with which it enables us to control, increase or otherwise modify the stimulation of the intestinal musculature.

In the description of the various methods given in the text this common feature of what may appear to be widely different processes is defined and in the author's work an agent is used just to the extent to which it seems to be indicated in a special case. For instance, in certain cases it is possible to regulate diet in such a way that precisely the requisite amount of intestinal peristalsis will be obtained. In many cases this is entirely impossible. Then again cases are found occasionally that may be cured by massage properly administered. While by no means ignoring these, and other methods of treatment, and while making use of them to the extent to which the peculiarities of certain cases may form an indication, the author has used and described a method that greatly facilitates the treatment in all cases and in many is indispensable.

Chronic constipation is one of the most common pathologic conditions with which the practitioner has to contend. It prevails in all civilized countries, among rich and poor, white and black, young and old. The cases as they appear before the clinician

are in all stages of advancement, and are often found associated with one or more of a great variety of complications. It is obvious, therefore, that however potent may be the remedy at our command, and however specific its action, it must occasionally be modified and supported in order to meet the different indications as they arise in various cases. For this reason the complications commonly found in connection with intestinal atony have been discussed at some length.

It is necessary for the practitioner who treats this condition to make a close investigation of complications. On the other hand, not every abnormal condition coexisting with chronic constipation has an etiologic relation to it. In many cases it is found that the latter will yield to treatment, while such associated pathologic conditions as hemorrhoids, retroflexed uterus, gastric or hepatic disease remain unchanged.

In many patients, chronic constipation marks the beginning of ill-health. It is often found to be the earliest disease factor to make an inroad upon a healthy constitution. Unlike tuberculosis, neurasthenia, etc., diseases that gain a foothold only upon those who are already in a weakened condition,

chronic constipation in a great many cases implants itself in vigorous people in the very prime of life. Not until months and years have passed, and innumerable remedies have been tried and failed does the victim begin to realize the tenacity of the disease. Sooner or later he begins to realize that there is a gradual decline in health, that other symptoms begin to be manifest, and that his natural power of resistance is diminished. It is at this stage that many patients first become anxious about their condition and seek medical advice.

It is chronic constipation more than any other condition that prepares the soil for the implantation of other grave diseases. There is probably no other pathologic condition that offers greater opportunities to the practitioner of medicine than does the study and treatment of intestinal atony, and there is no other disease in which scientific treatment can afford more prompt or successful results.

A sharp contrast is drawn between constipation and obstipation. They rarely exist together. In fact there is a sort of incompatibility between them. Obstipation is a surgical disease, and its treatment not infrequently requires an intimate knowledge of and skill in rectal and intestinal surgical procedures.

24 CHRONIC CONSTIPATION.

The work contains an enumeration of some of the more common forms of obstipation and a brief description of the surgical technique used by the author. The use of palliative measures is fruitless and frequently disastrous in these cases.

CHAPTER I.

ANATOMY AND PHYSIOLOGY.

The Large Bowel—The Ileo-cecal Valve—The Colonic Musculature—The Colon—Functions of the Colon—Peristalsis—Tone—Catharsis—Chemistry of the Gastrointestinal Tract—Nothnagel's Statement—Hemmeter's Experiments on Dogs—Stretching and Contraction Favors Metabolism—Spencer's Generalization—Some Physiological Facts—Distension by Food and Waste Material—Mechanical Disturbance—Functions of the Lower Bowel—The External Anal Sphincter—The Internal Anal Sphincter—The Levator Ani Muscle—The Rectal Valves—Method of Examining Rectal Valves—The Blood Supply—Enervation of the Intestine—Mall's Theory—Stimulus of the Nervous System—Purgatives—The Mesocolon and Mesorectum—The Rectum.

In order to get a clear conception of the anatomical and physiological facts that have a direct bearing on constipation and obstipation, the large bowel may be described as a muscular tube, ten to twelve decimeters in length, closed at its upper extremity by a valve, and at the lower by a sphincter.

It is obvious, therefore, that there are three primary facts in the mechanism of normal bowel evacuations:

1. The ileo-cecal valve prevents regurgitation into the small intestine.
2. The colonic musculature provides the force that propels the contents onward.
3. The sphincters furnish a certain amount of resistance to be overcome.

The following structures also have an important bearing on the subject:

1. The mucous and serous membranes of the colon.
2. The blood and nerve supply.
3. The attachments and supports.
4. The positions and relations.

The ileo-cecal valve is the portion of the ileum that protrudes into the cecum. It is a semilunar fold of membrane arranged transversely to the long axis of the bowel. The slitlike opening from the ileum is in the free margin of this fold which is therefore divided into two halves or lips, an upper and a lower. The upper lip is more prominent than the lower and protrudes beyond it.

The valve consists of all the coats of the bowel

except the peritoneal, that is, it contains mucous membrane, fibrous and muscular tissue. Its function is to prevent the regurgitation of solids and liquids from the large into the small bowel. Peristaltic contractions of the cecum and ascending colon close this valve firmly. In the absence of peristalsis, the colonic contents exert pressure in such a way that the lips of the valve are made to cover the opening and prevent regurgitation. It is obvious that this valve is a factor which tends to produce an increased accumulation of fecal material in the colon.

At a certain period of embryonic life the large and small bowel do not differ in caliber, and this condition is found in some of the lower animals. Wherever the size of the intestine is the same throughout there is no valve.

It is believed that the formation of the ileo-cecal valve has been brought about by a sort of intussusception. The greater density of the contents of the lower bowel, its slower movement, and the action of gravity in the ascending colon, are factors that favor such morphological explanation.

The musculature of the colon is the chief factor in effecting the evacuation of waste material from

the intestine. The outer fibres are arranged in three longitudinal bands, while the circular fibres are nearly uniform in their distribution. The length of the longitudinal bands is less than that of the other coats of the gut, and consequently there is the characteristic sacculation of the large intestine.

In the appendix and in the rectum the longitudinal muscle fibres spread out to form a uniform covering. The circular muscular fibres of the intestine form a complete tube, being held together by a cement substance. It is believed that stimulation may pass from fibre to fibre without the intervention of any nervous mechanism. In the anal region there is an accumulation of circular fibres forming the internal sphincter.

The two chief functions of the colonic musculature are:

1. The formation of a fecal receptacle.
2. The expulsion of the bowel contents at certain intervals.

In addition to these, there are three less obvious functions:

1. The propulsion of the blood along the portal vein.
2. Antiperistalsis.

3. Digestion and absorption.

The colon is the reservoir for the waste from the digestive tract. This is the important service it renders to the system. Whatever functions it may have performed in his antecedents, in man it has become a receptacle, somewhat analogous to the gall-bladder or urinary bladder, in which fecal material collects and is retained for a length of time. Mr. Arbuthnot Lane describes the colon as the cesspool of the intestinal tract.

In the formation of this receptacle the serous and the mucous coats are concerned, but under normal conditions the caliber of the colon, the distribution of its contents, and its ultimate evacuation are determined by its muscular coat. The whole extent of the colon does not seem to act uniformly the part of a receptacle. Fecal collections are found most frequently in the cecum and sigmoid. In persons who have one movement in twenty-four hours, fecal material remains in the colon about twenty hours. At the expiration of this time the stretching of the colonic muscle has reached such an extent and has continued sufficiently long to induce active contraction. That these colonic contractions occur at regular intervals and at a certain hour each day has

been ascribed to habit. This question is discussed in a later part of this chapter.

The active factor in propelling the bowel contents onward and in effecting its evacuation is a peculiar wave-like contraction of the intestinal muscle fibres, known as peristalsis. However, before passing to a consideration of peristalsis, it is desirable to have an understanding of that peculiar characteristic of muscle described as "tone."

This word is not always used with precision. When applied to tissues that are not elastic, it has a meaning different from that which it denotes when it refers to muscle. The word is derived from the Greek *teino* (to stretch), or *tono* (a rope). "Tone" is not synonymous with "strength," nor with "nutrition" nor with "irritability." It is scarcely necessary to say that "atony" and "atrophy" do not refer to the same condition.

"Tone," as applied to muscle, denotes that inherent activity by virtue of which it tends to assume a contracted condition. When nothing opposes this tendency to contract, the muscle is shortened. Accordingly a muscle fibre with normal tone does not rest at its full length.

Muscular tone varies from time to time. Nor-

mally it is the lowest, and the caliber of the colon is the greatest immediately after active peristalsis, that is, when the muscle is tired.

There are two phenomena which depend directly upon the tone of the colonic muscle:

1. The limitation of the caliber of the colon.
2. The response to stimuli.

Under normal conditions the caliber of the empty colon is about one-third of that of the full colon. The smaller the caliber the smaller the amount of material required to distend it. In other words the better the tone the smaller the stimulus sufficient to induce peristalsis.

Intestinal peristalsis is a contraction in succession of the circular muscular fibres of the bowel. The movement begins above and extends downward, and is such that the contents of the bowel are moved in front of it. This movement is facilitated by a synchronous dilatation of the gut in front of the object. At the same time the longitudinal fibres contract, and in this way the dilated portion of the bowel is drawn over the contents.

One peristaltic wave traverses only a short portion of the intestine, and it often terminates abruptly. Peristaltic contraction may be going on in sev-

eral parts of the intestine at the same time. It is a fact of some interest and importance that peristalsis occurs in the bowel above the part stimulated. For example peristalsis is induced throughout the entire colon by stimulation in the rectum or sigmoid.

A very important part of the physiology of the colon is the consideration of the stimuli of its peristalsis. What are the factors that normally induce the movements of the large bowel? The question may be confined to the large bowel for two reasons. First, because it is to deficient movement in this viscus that chronic constipation is due, and secondly, it is quite probable that the nature of the stimuli in different portions of the gastro-intestinal tract differs, and accordingly it is necessary to consider each portion separately. Three theories are held concerning these stimuli in the colon :

1. That the stimuli originate in the nervous system.
2. That they are chemical irritants in the bowel contents.
3. That they are mechanical disturbances caused by the bowel contents.

It is somewhat misleading to state that authorities hold one of these and exclude the others, the dif-

ference is rather in the amount of emphasis placed on the one or other of these factors.

It is well known that intestinal peristalsis may be induced by stimuli other than those of the bowel contents. For example, certain substances in the circulation produce peristalsis. Dr. A. B. MacCallum has demonstrated that certain substances injected hypodermatically bring about catharsis. His experiments with magnesium sulphate and other aperient remedies would seem to demonstrate that these remedies have a similar action when used hypodermically as when given per orem.

These experiments seem to favor the view that substances in the blood so affect the motor centres that motor stimuli are transmitted to the muscular tissue of the bowel.

A centre controlling defecation has been located in the lumbar region of the cord. It is also well established that stimulation of the vagus produces contraction of the circular fibres and inhibits the longitudinal, while stimulation of the splanchnics gives an effect the reverse of this. Accordingly, it has been suggested that alternate action of the sympathetic and cerebro-spinal nerves would explain most of the phenomena attending intestinal peristalsis. In

addition to this, there are the nervous plexuses in the bowel wall—Auerbach's and Meissner's. The latter is thought to control, regulate or stimulate peristalsis.

During the last decade the chemistry of the gastrointestinal tract has occupied a very conspicuous place in medical progress. However, it has been confined for the most part to a study of the processes of digestion and other forms of fermentation, and its effect on peristalsis has not been so conspicuous.

It has been shown that the opening and closing of the pylorus depend upon the reaction of the contents of the stomach and duodenum. It is also known that when a crystal of sodium chloride, or other hygroscopic substance, is brought into contact with the intestine it produces peristaltic contractions. Then, again it is a matter of clinical observation that many substances with active chemical characteristics induce violent peristalsis. In fact it is a prevailing belief that cathartics as well as the products of putrefaction in the alimentary tract owe their purgative effects to their chemical properties.

These observations have led to a widespread belief that the chemical irritation produced by certain

substances that go to make up the bowel contents, is the normal stimulus of intestinal peristalsis. According to Nothnagel, chemic irritation is a necessary factor in the production of normal intestinal peristalsis. He states that "Substances that are chemically indifferent can only act when their temperature varies greatly from the normal body temperature or when they are present in large bulk so as to cause considerable distention of the bowel."

However, he suggests that chemical irritation is frequently responsible for abnormal peristalsis. He enumerates the conditions under which increased peristalsis may arise as follows:

1. When the contents of the bowel are abnormal, as from acidity or copious development of gas.
2. After the administration of purgatives.
3. The effect of intestinal irritants, either thermic or chemic.
4. After emotional shocks.
5. In neurasthenia.
6. In acute inflammatory states of the bowel.
7. In stricture of the bowel.

Hemmeter states that the intestinal movements "under physiological conditions are caused by the irritation of the contents, chyme, feces or gas."

From the context it appears that the irritation is both chemical and physical.

We believe that the role played by mechanical stimulation in the production of intestinal peristalsis is a very important one, and has not received sufficient attention. This is especially true of the colon, where mechanical disturbance is undoubtedly the chief factor in the production of normal peristalsis. Under normal conditions the important feature is the quantity, not the quality, of the colonic contents. If the reverse were true, a small quantity of feces would stimulate peristalsis as effectually as would a much larger amount.

While it is a common clinical experience to observe that a small amount of irritating material produces even violent peristalsis, the process seems to differ from the normal in several important particulars.

The author's investigations of this subject lead him to the belief that in health, under physiologic conditions, the chemical character of the feces is of no importance, that is, so far as the production of peristalsis in the colon is concerned. An inert substance, without any chemical affinity for any substance in the intestine, is a perfect agent as a

stimulus for peristalsis, if its consistency is suitable and its quantity is sufficient.

Many clinical observations favor this view, but in order to gain additional proof the author experimented upon dogs to observe the effect of different agents upon peristalsis. To determine the effect of distention, the dog was chloroformed, and the abdominal viscera exposed by long transverse and longitudinal incisions. A collapsed thin rubber bag was then inserted through the rectum into the colon, and this bag had a tube attached for the purpose of inflation. With this apparatus any degree of distention of the rectum or colon can be obtained. The presence of the uninflated bag in the intestine produces no contraction. Moderate distention is followed, after a length of time, varying in different dogs, by waves of contraction.

Usually the contractions begin immediately above the bag and later affect portions of the bowel more remote. As distention is increased, peristalsis follows more promptly, and wave after wave propels the bag along. These contractions generally continue after the distention has become so great that the bowel is ruptured. In most cases contractions of the abdominal muscles accompanied the peristal-

sis when the latter had reached a certain strength.

The contraction produced by chemical irritants, such as sodium chloride, resembles a spasm. The portion of gut about the point touched by the chloride becomes cordlike and blanched, and remains in this condition for a length of time, while the contractions induced by distention resemble in every particular physiologic peristalsis. These experiments seem to demonstrate that distention alone without the addition of any chemic or thermic stimulation, is sufficient to produce normal intestinal peristalsis.

It has been contended by some physiologists that stretching increases and contraction diminishes the volume of a muscle fibre, and that this change in volume promotes the absorption of nutrition and the elimination of waste, respectively. Whether this be a fact or not, it still remains true that the change of form incident to the stretching and contraction favors metabolism in the muscle cell. It will be seen therefore that the nutrition of the intestinal muscle depends, to some extent, upon the very stimulus that normally induces its activity. According to Herbert Spencer the evolution of the gastrointestinal musculature is made intelligible only when stretching is recognized as the stimulus of peristalsis.

One of the characteristic features of modern medical progress is the demand for principles fundamental in organic life. However, the phylogenesis of the muscle fibres of the intestine has not been subjected to thorough investigation, but a study of the literature bearing upon the subject confirms the conclusion that distention is a most important agent in producing peristaltic contractions in the alimentary canal.

The following statement from Spencer's "Principles of Biology" seems to have been accepted by subsequent writers: "If we remember that the muscular colloid is made to contract by mechanical disturbance, and that among mechanical disturbance the one that will most readily affect it throughout its mass is caused by stretching, we shall be considerably helped toward understanding how the contractile tissues are formed."

The observations upon which Spencer based this generalization have not been published, but a few facts are here subjoined that have a bearing upon the subject.

1. When a granule of vegetable carmin is ingested by one of the protozoa, it is retained in the cell protoplasm for a time and then ejected. The car-

min stimulates the tissues of the organism to contract and this contraction results in the expulsion of the foreign body. The carmin undergoes no chemical change in the protoplasm and consequently the contractile tissues of the protozoa must be stimulated by the mechanical disturbance caused by the carmin. In this way, not only is the protoplasm stimulated to contract, but the contractile tissues are developed and differentiated from the secretory, nervous and other structures of the organism. In fact, in other protozoa there is

2. A contractile vacuole which contains the food, waste and other foreign substances, and it is only when distention of this vacuole has reached a certain degree that contraction begins. This contraction is made evident by the changes in the form of the vacuole, by its propulsion to the outer portion of the cell, and by its subsequent protrusion and rupture.

3. In certain higher forms of animalcule there is a permanent stomach which communicates externally by a permanent canal. The water containing possible nutrient material is swept into the stomach by cilia, until a certain distention is reached, and then a sudden contraction empties the stomach

through the same canal as that by which it was filled. Here, again, in the absence of any contrary evidence, distention must be recognized as the stimulus causing the contraction.

4. In organisms more highly developed the digestive processes are more elaborate, there are longer intervals between feedings, longer retention of food and consequently more prolonged and greater distention. Under these circumstances and synchronously, two new structures appear—muscular tissue in the digestive tract, and a distinct and separate anal orifice for the elimination of waste.

The common earthworm is one of the lowest forms in which these products of evolution are found. The very large amount of material that passes through the alimentary canal of this organism necessitates well developed contractile tissue.

In other words, the extensive stretching and contraction to which the gastrointestinal tract is subjected produce in it a muscular coat. It is scarcely necessary to say that the same natural agent that is instrumental in the development and phylogenesis of an organ, is the agent that must maintain it so long as its function remains the same, and accordingly distention by food and waste material is a

necessary factor in the maintenance of a healthy condition in the muscle of the alimentary tract. It has already been pointed out that chemical irritation stimulates the intestine to contract, but it is probable that this is unusual, that is, such action only happens when there is present some unusual chemical in the bowel contents.

Mechanical disturbance has to do with the muscle of the gastrointestinal tract, with its evolution, with its maintenance in a normal condition and with its stimulation, while on the other hand the chemical characteristics of the food bear an analogous relation to the secretory glands of the digestive fluids.

Provision is made for considerable retention of feces in the lower bowel. In the first place, it is not until a certain degree of distention is reached that peristalsis begins, and in addition to this there are several structures whose function it is to furnish resistance to the too free passage of the bowel contents. The latter have an important bearing on chronic constipation and obstipation, for in certain pathologic conditions they offer abnormally great resistance. They may be enumerated as follows:

1. The external anal sphincter.
2. The internal anal sphincter.

3. The levator ani muscle.
4. The rectal valves.

The external anal sphincter is a thin voluntary muscle that lies immediately beneath the skin and surrounds the lower end of the gut. It is attached posteriorly to the tip of the coccyx, and in front to the perineum. Normally between defecations it remains contracted. It is periodically dilated by the passage of excrement. By voluntary effort its resistance may be greatly increased.

The internal anal sphincter is above and in a plane anterior to the external. It is an involuntary muscle, consisting of an accumulation of the circular fibres of the intestine. A fold of mucous membrane that extends outward from the lumen of the rectum separates the two anal sphincters. Methods of examination in the living subject usually eliminate this fold by stretching the mucous membrane. The internal sphincter opposes the passage of excrement until the major forces that effect defecation are well under way, it then affords assistance in the final act of defecation.

The levator ani is a large and important muscle forming the floor of the pelvis. It is flat, having a wide origin and insertion. It arises from the pos-

terior surface of the horizontal ramus of the pubes. from the obturator fascia, and from the tuber ischii. With the exception of an inch at the symphysis, the origin of this muscle may be represented by a semicircle including the anterior half of the circumference of the pelvis. The line of insertion extends from the tip of the coccyx to the anterior part of the perineal body.

The levator ani is one of the supports of the rectum. Its action on the lower portion of the gut is to draw it upward and forward. It has also a sphincter-like effect on account of which it has been called the third sphincter.

The rectal valves are structures in the upper portion of the rectum, that may be seen and studied by a proctoscopic examination of a patient in the knee-chest position. When the rectum is distended in this way, one or more, generally three, shelf-like structures are seen to project from the wall and obstruct the view. These are the rectal valves. They were first described by Houston in 1830, and since that time they have been the subject of much controversy. Their existence, location, and general appearance can be demonstrated by anyone who is familiar with the use of a proctoscope.

There are two facts that will be of use to those who desire to study the rectal valves for the first time.

1. The normal rectal valve cannot be detected by digital examination.

2. The rectal valves cannot be seen unless the rectum be distended with air. Search for these structures with the patient on his back or side and without distention of the rectum will be in vain and if sufficiently painstaking may lead to skepticism.

The valves are usually situated alternately on the sides of the rectum, and while their location varies in different persons their position in each individual is constant. When two valves occupy the same level in the rectum and are attached to opposite walls they may constitute a veritable diaphragm completely obstructing the view. However, they are commonly found at different levels.

Each valve is crescent-shaped, and its base extends about one-half of the circumference of the rectal wall. It consists of mucous membrane, fibrous and muscle tissue. Rectal valves differ greatly in their power of resistance to pressure. A consideration of the nature and location of these structures will suggest their physiologic function, however, it

must be admitted that conclusive proof is difficult to obtain. The functions that have been ascribed to them are:

1. They support the feces and prevent the discomfort from constant pressure on the sphincters.
2. They equalize the pressure in the rectum.
3. During defecation they oppose the return of the feces to the sigmoid.

The medical profession are indebted to Gant, Martin, Pennington and other American proctologists for valuable contributions to the recent literature on this subject.

The blood supply of the colon and rectum is furnished by the superior mesenteric, the inferior mesenteric and the internal iliac. The right, middle and left colic arteries, branches of the superior mesenteric are distributed to the cecum, ascending and transverse colon. The left colic and sigmoid arteries and the superior hemorrhoidal, branches of the inferior mesenteric supply the sigmoid flexure, the descending colon and the rectum.

The middle and the inferior hemorrhoidal arteries arise from the internal iliac and internal pudic respectively. The veins corresponding to these arteries unite to form the portal veins. There is a

profuse anastomosis among these arteries and among the veins. An important circumstance in connection with circulation in the portal system is the fact that the inferior hemorrhoidal vein is a branch of the iliac, and in this way there is formed an anastomosis between the portal and the general circulation.

The enervation of the intestine is furnished by the cerebrospinal and the sympathetic systems through the vagi, the inferior mesenteric, the hypogastric, and the plexuses of Auerbach and Meissner. Physiologists differ widely as to the extent to which intestinal movements are controlled by these nerves. A number of authorities hold that the stimuli are carried from muscle fibre to muscle fibre without the intervention of nervous influence. On the other hand Nothnagel and others believe that nerve influence is concerned directly in all peristaltic movements.

Experiments seem to indicate that certain fibres conduct motor while other fibres carry inhibitory impressions. It is found that stimulation of the vagus produces contraction of the circular fibres, and stimulation of the splanchnics causes contraction of the longitudinal muscular fibres.

A theory advanced by Mall is that the *vagus* contains the motor fibres for the circular muscle and the inhibitory fibres for the longitudinal, while the splanchnics have a reverse function. Accordingly, alternate stimulation of these nerves would result in the alternate contractions of the circular and longitudinal muscles.

However, it is quite possible that the nerves may not take any very active part in the production of intestinal peristalsis, and that only under abnormal conditions is the stimulus of the nervous system brought into play. The violent peristalsis that is produced by the ingestion of certain intestinal irritants may be due to stimuli emanating from nerve centres. It is a matter of common clinical experience that in patients who take purgatives the bowel gets habituated to one drug.

In other words it has lost its stimulating effect on the intestine. This habituation would seem to belong to the nervous system. It indicates that when substances with active chemical properties come in contact with the intestinal wall they produce active peristalsis. However, it is the province of the secretory system of the intestine to so adjust itself that chemical stimuli may not continue to dis-

turb the motor apparatus, and as soon as this is accomplished, these substances cease to stimulate peristalsis.

The failure to respond to the accustomed dose of a purgative does not indicate that there is a loss of muscular power, for a change of purgative will give an active response. Jacques Loeb has demonstrated that in certain marine animals the complete destruction of the nerve centres does not interfere with intestinal peristalsis. In experiments upon dogs the complete separation of the colon from the mesocolon does not seem to affect its response to stimuli. That the nervous system should directly influence peristalsis only under unusual or abnormal conditions is a circumstance not without analogy.

Similar provision against unusual pathogenic agents is found in all living tissue. For example, new substances such as antitoxins are formed in the blood when mixed with and stimulated by some unusual poison, and connective tissue cells take on a special function in the healing of wounds. Is it not quite possible that an organ such as the intestine exposed as it is to the greatest variety of destructive substances, should be provided with an emergency apparatus operative only under extraordinary con-

ditions? This view is in accord with that expressed by Engelman, and offers an explanation of the clinical observations upon the use of cathartics.

The transverse mesocolon and the mesosigmoid are relatively much longer than the attachments of the ascending or descending colon or rectum, and accordingly the transverse colon and sigmoid may normally occupy a great variety of position. The transverse mesocolon extends from the right to the left hypochondriac region and its attachment is such that the transverse colon is suspended across the upper region of the abdominal cavity forming a curve with the convexity downward. When distended with gas it presses upward and forward and then occupies a position immediately under the anterior abdominal wall, where it may be readily located by percussion. The retention of large quantities of feces causes it to sag toward the pelvis. It may be readily understood that the transverse colon is frequently subjected to factors that tend to produce an enteroptosis. When this occurs the terminal portions generally retain their normal position and the displacement consists of a sagging of the middle portion.

This form of acute coloptosis often produces

acute and obstructive angulation, and in such cases there is a chronic obstipation. In its transverse attachment the mesosigmoid resembles the transverse mesocolon. It begins in the left iliac region at the outer margin of the psoas muscle and ends in front of the middle portion of the sacrum. The upper and lower portions of the mesosigmoid are short and accordingly the upper and lower extremities of the sigmoid are comparatively fixed, but the middle portion of the mesosigmoid is three or four inches in length.

This permits the middle portion of the sigmoid to vary widely in position, so that at one time it may rest on the floor of the pelvis and at another above the brim.

Another circumstance of interest and importance is the fact that the parietal attachment of the mesosigmoid is only about six inches while the visceral attachment is as long as the sigmoid—from sixteen to twenty inches. It follows that this portion of the bowel must be coiled upon itself. A full sigmoid is normally found at the brim of the pelvis, but while in an empty condition or only partially filled it occupies a much lower level. As the sigmoid becomes filled it rises, and assumes a position

more favorable for the passage of its contents into the rectum.

The rectum as described by recent writers is the terminal portion of the bowel free from peritoneal covering. It is bound by connective tissue to the sacrum and coccyx. The lower portion has a relatively fixed position. It is supported in front by the recto-vaginal septum, posteriorly by the recto-coccygeus muscle and on all sides by the levator ani. The lower two inches of the rectum including the anus admits of considerable antero-posterior movement especially in patients in whom the amount of fat is much below normal.

The mesocolic attachments of the ascending and descending colon are comparatively short and the layers of peritoneum generally separate. Accordingly, there is a portion of the posterior wall of the bowel not covered with peritoneum. This space contains the right and left colic arteries and is filled with connective tissue and fat. Dr. Howard Longyear has demonstrated that in cases of floating kidney this connective tissue becomes a veritable ligament—the nephro-colic—possessing important surgical features,

CHAPTER II.

ETIOLOGY OF CONSTIPATION.

Definition of Chronic Constipation—Not a Disease But a Symptom—Causes—The Essential Point—Infrequency of Stool—Normal Movements—Pathologic Conditions—Illovey's Classification of Diseases of which Chronic Constipation is a Symptom—Nothnagel's Grouping—Immediate Causes of Constipation—Constipation—Obstipation—Atony—Abnormal Irritation—Chronicity—Two Distinct Problems—Differentiating—Atony of Rectum More Prevalent in Women than in Men—Degree of Atony—Mild Cases—Severe Cases—Complete Cases—Premature Atrophies—Hypertrophies—Mind Over Matter—Structural Retrogression—"The Simple Life"—Improper Diet—Fermentation—Putrification—The Most Important Factors—Meat Diet—Fats—Vegetables—Water—Worry and Severe Mental Work—Bodily Inactivity—Ill-advised Use of Cathartics—Intestinal Neurosis—A Typical Case—Indigestion—Chronic Colitis—Clinical Types of Chronic Enteritis—Inflammation of the Cecum—Appendicitis—Typhlitis—Peritonitis—Intestinal Neoplasm.

Chronic constipation is the habitually prolonged retention in the bowel of fecal material which grad-

usually becomes hardened on account of the excessive absorption of its liquid constituents. It is not a disease but is a symptom of some functional or organic derangement. A faulty diet may produce a temporary constipation in a sound person, but this cannot be called chronic or habitual unless and until some pathological change has taken place. There is one fact that should be kept in mind viz. that defecations may occur with comparative frequency and regularity in chronic constipation. Some of the worst cases have one or two movements of the bowels in twenty-four hours.

The essential point is not the infrequency of defecations, but the prolonged retention of feces. In the majority of cases, however, there is a marked infrequency of stools. Again, some persons do not have a bowel movement oftener than once in two, three or even four days and are nevertheless apparently in good health. This brings us to the question as to the normal length of time between movements of the bowels. One movement in twenty-four hours is most common for adults.

However, some persons are not in good health unless they have two bowel movements a day. It does not seem quite satisfactory to explain this

difference by ascribing it to individual peculiarity. It is necessary to revert to the physiology of peristaltic stimuli in order to obtain a probable explanation of the normal variations in this function. When the feces accumulate in the sigmoid and upper rectum in sufficient quantities to cause some stretching of the bowel, peristaltic contractions begin and these culminate in defecation. In many persons the accumulation of twenty-four hours, but in others forty-eight hours or longer, is required before the amount sufficient to produce the necessary stretching is supplied.

The capacity of the sigmoid varies in different persons, and there is also a great variation in the amount of fecal residue. Upon these two circumstances depends the length of time that may normally elapse between bowel evacuations. On the other hand, just as soon as the accumulated feces are sufficient in quantity to cause stretching of the sigmoid and effectual peristalsis does not follow, then there is a pathologic condition.

Before proceeding to the etiology of chronic constipation it is desirable to adopt a classification. Illoyay's classification has been used by many writers on this subject. It is as follows:

A. Chronic constipation produced by well-defined morbid processes.

1. Obstruction of the lumen of the bowel, such as strictures, growths of the bowel, or tumors pressing on the bowel.

2. Impairment of secretion poured into the bowel in chronic disease of the liver or pancreas.

3. Chronic inhibition of peristalsis through nerve centres, in chronic disease of the brain and spinal cord, in chronic insanity, diphtheritic paralysis, tabes, etc.

4. Chronic venous engorgement of the portal vein.

5. By chronic abstention from stool on account of the pain it causes by reason of a diseased condition of the rectum, in piles, fissure, ulcer, etc.

6. By changes in the mucous membrane which impair its irritability, and render it incapable of performing the physiologic functions, indigestion, chronic catarrh, mucous colitis, atrophy of the colon.

7. By atony of the intestinal muscles produced by morbid processes in the intestines and stomach.

B. Chronic constipation from foreign bodies.

C. Chronic constipation from

1. Malformations in abnormally developed col-

on; undue size or length of sigmoid flexure, diaphragms of the large bowel, diverticula in the large bowel.

2. Defection of, or essential atrophy of the colon.

3. Dislocation or enteroptosis.

D. Chronic constipation from impaired function.

1. Perverted action, enterospasm, spasm of the sphincters.

2. Imperfect performance of physiologic function.

This is a good summary of the diseases of which chronic constipation is a symptom.

Nothnagel distinguishes three chief etiologically different forms of chronic constipation.

A. A group in which sluggishness of the bowels is dependent upon the perversion of certain functions that still remain physiologic.

B. A group in which sluggishness of the bowels is the direct result of certain pathologic states and constitutes a more or less important symptom associated with other abnormal conditions.

C. A group in which sluggishness of the bowels is the essential feature of the disease and forms

apparently (or perhaps really) an independent pathologic type (habitual sluggishness of the bowels).

To distinguish group A. from group C. is a useless refinement and is probably without foundation in fact. As an example of group A. Nothnagel cites perversion of peristalsis produced by the character of food. It is a well known fact that the ingestion of special articles of diet by certain persons diminishes the frequency of bowel movements. In such cases one of two conditions is present, either the bowel has retained its normal condition and the customary frequency of bowel movements will return when the original diet is resumed, or the diminished activity will persist even after the resumption of the more stimulating diet. If the first occurs it is not chronic constipation, and if the second, then it cannot be distinguished from group C.

Fleischer distinguishes four classes of chronic constipation. Three of these correspond with the three groups given by Nothnagel, and his fourth class is defined as a partial or resultant phenomenon of other affections, particularly neurasthenia, but in which the symptoms of constipation are so prominent as to control the clinical picture completely and give the impression of an independent disease.

Consistent with the view taken of the physiology of peristalsis in the foregoing chapter, and to facilitate a description of the treatment a slightly different arrangement of the classes will be given here. The immediate cause of chronic constipation may be divided into two classes:

1. Conditions in which the chronic constipation depends upon a failure in the intestinal muscle.
2. Conditions in which the retention of feces depends upon abnormal resistance to its passage. This classification conforms sufficiently to the requirements of logic; any case that can be excluded from the one must belong to the other.

The practical advantages of this classification are evident. For some time clinicians have found it convenient to use two terms "constipation" and "obstipation" to distinguish these two conditions. Hereafter we shall reserve the word constipation for those cases in which there is faulty action of the intestinal musculature and in which there is absence of any abnormal obstructive interference.

In chronic constipation the impairment of function depends upon the lack of tone in the muscle of the bowel. This condition of the muscle is known as "atony." This word may not be etymologically

60 CHRONIC CONSTIPATION.

appropriate but it serves to designate a well known condition of muscle tissue.

It is assumed that the muscle fibre possesses not only contractility, but also power to receive impressions, that is, it is a sensory as well as a motor organ. According to this view the impression is received by the muscle fibre and immediately transformed into a contraction. Whether atony consists in an impairment of the sensory or of the motor function is not known. However, it would not alter the practical question if a nervous element were present. In that case the impression is conveyed to a nerve centre and a motor impulse carried back to the muscle fibre. If this view be adopted the word "neuromuscular" atony would be more suitable.

When a normal amount of fecal distention fails to induce peristalsis and fails habitually in the way peculiar to cases of chronic constipation, then the intestinal muscle is at fault. The physiologic stimulus, stretching, is applied to the muscle and it fails to contract. Atony of the intestinal muscle is the disease, chronic constipation is the symptom. A study of the etiology of the latter will consist chiefly of a consideration of the causes that produce and

the factors that maintain this muscular atony. For practical purposes all cases of intestinal muscular atony may be divided into two groups:

1. Cases in which the atony is not maintained by any other disease.

2. Cases in which the intestinal muscular atony is maintained by other concomitant diseases.

The chronic constipation due to intestinal muscular atony that is not maintained by any other disease includes Class A. and Class C. of Nothnagel. The sluggishness of the bowels is the essential feature of the disease which is "in all probability an independent pathologic type." With the exception of the constipation these patients are in good health. In some patients there are concurrent diseases which have little or no effect on the constipation. That there is a pathological condition of the intestinal muscle in these cases is made manifest by the fact that feces collect in the colon distending its walls without producing peristalsis.

Not until the distention has become excessive or there is formed abnormal irritation from the products of decomposition do bowel movements begin. In these cases the muscle is not paralyzed, nor does it lack strength, muscle fatigue may be elimi-

nated, and there is absence of any gross pathologic lesion. This description answers precisely for the condition known as muscular atony. Nothnagel's Group A. which he defines as a kind of constipation in which the sluggishness of the bowels is dependent upon the perversion of certain functions that still remain physiologic would seem to belong to this same class. As an example of this physiologic constipation, Nothnagel cites the intestinal sluggishness that occurs in certain persons on a milk diet.

But the diminished number of evacuations in certain persons when they are confined to special diets may result from the diminished amount of waste, an amount insufficient to cause stretching of the intestinal wall. It is possible that, notwithstanding the insufficiency of the stimulation and the consequent infrequency of defecations, the tone of the intestinal muscle might remain normal. Under such circumstances as soon as the accumulated fecal material reaches the normal amount a bowel movement will occur and as soon as the person resumes his usual diet the ordinary regularity of the bowels will be reinstated. It is unfortunate to call this chronic constipation,

"Chronicity" signifies that there is a perversion of function that is persistent because it depends upon some persistent structural impairment. One would not say that a man who had been set upon by thieves every morning had formed a habit in this regard, or that it was chronic with him. A case in which the nature of the food is entirely responsible for the diminished frequency of bowel movements and in which the bowel retains its normal tone responding to stimulation in a physiologic manner, cannot be classed as chronic constipation. But in practice such cases are rarely, if ever, found.

Any diet that so diminishes the amount of fecal waste that bowel movements are thereby made unusually infrequent, will produce, if persisted in for a length of time, atony of the intestinal muscle. Accordingly Class A. of Nothnagel's classification is included in the group under consideration, viz., chronic constipation due to intestinal muscular atony. From a careful examination of several hundred cases of chronic constipation treated and carefully observed during the last three years it would seem that about seventy-five per cent belong to this class.

The etiology of this class, that is, of chronic con-

64 CHRONIC CONSTIPATION.

stipation due to uncomplicated intestinal atony presents two distinct problems:

1. To ascertain that the atony is the sole immediate cause of the constipation (differential diagnosis).
2. To ascertain the cause of the atony (remote or primary cause). The first of these requires the use of the method of exclusion.

Not infrequently patients who think they are perfectly healthy with the exception of the sluggishness of the bowels, are found to be suffering from chronic colitis, chronic obstruction, or other disease directly responsible for the retention of feces. Having, by careful and repeated examinations excluded all such conditions, the conclusion is reached that atony of the intestinal muscle is the immediate and sole cause of the disordered function. It is also necessary to determine what portion of the bowel is affected. In the great majority of cases, perhaps in all cases the atony is in the colon or rectum, and in a large proportion of patients it is found in the sigmoid flexure. However, in some cases the coprostasis is in the cecum.

Abnormal accumulation and retention of fecal matter in the cecum is of special importance on ac-

count of its tendency to produce inflammation in this region. Atony of the rectum is a condition well known to clinicians. It is a condition found more frequently in women than in men. In many cases it is due to the injury produced during childbirth to the rectal supports. Bretonneau, who was the teacher of Velpeau and Trauseau, was the first to point out to the profession the nature of atony of the rectum and its importance in causing coprostasis.

In addition to the determination of the location it is well to estimate the degree of the atony. It must not be inferred that anything approaching mathematical precision can be obtained, but it is well for the practitioner to have a system by which he may be guided in his subsequent treatment and prognosis. In the author's notes of cases he has used the terms "mild," "severe," and "complete," to designate the degree of atony. Mild cases are those in which the defecations occur with regularity for a few days and then follows a number of days during which there is no evacuation. These patients have to resort to an occasional cathartic or enema. The same degree of atony is found in those cases that become constipated, unless special attention is paid to diet,

Then there is a type of case in which there is a tendency to excessive collections of feces with no tendency to evacuation unless some artificial means are used. These are the cases in which fecal impactions occur. In such cases the atony is complete. The term "complete" is applied to these cases because the normal stimulus of distention however great or however long applied, does not induce effectual peristalsis, and consequently the atony may be called complete.

Between this type of case and the mild cases there is an intermediate degree which may be designated "severe." In the severe type the patient is compelled to use cathartics or enemata. The condition of the bowel is such that no effectual movement occurs until the accumulation and the stimulation is much greater than normal. However, before this takes place the discomfort and uneasiness are such that the patient is usually impelled to resort to the use of drugs. These patients drift from physician to physician, and have a practical knowledge of all the cathartics in the pharmacopœia.

The condition of the bowel, whether mild, severe or complete, may remain very much the same for years. We have dwelt somewhat fully on the na-

ture and location of simple atony of the intestinal muscle, because of its prevalence, its insidiousness, and its baneful consequences. We now come to the question of etiology proper. What cause or causes are responsible for this most common form of chronic constipation?

From a consideration of this disease one is convinced that there is an antagonism, probably only partial and temporary, between man's progress and his physical well-being. Premature atrophies and hypertrophies, and many other diseases can be directly traced to conditions incident to advancing civilization. The supremacy of mind over matter has not only put a stop to further evolution of the human organism but actually seems to jeopardize what has been attained. As intelligence and ingenuity supply more perfect substitutes for the organic functions, structural retrogression is bound to follow. This process is an etiologic factor in many of the pathologic changes that are found in the alimentary tract. The modern methods of preparing food and other features of our time are responsible for the atony that so frequently affects the intestinal muscle.

Long before the simple life became popular in

modern fiction the medical profession pointed out the unhealthfulness of a life of luxury, indolence and ease, and on the other hand the equally injurious effect upon man's physical well-being of the feverish ambition that ignores the demands of the organism. There are several features in modern life that have a tendency to produce retrograde processes in the gastrointestinal tract. Some of these have a special bearing upon chronic constipation, and these are said to prevail in this more than in any other country.

Of the factors that tend to produce chronic constipation probably none is more important than :

1. Improper diet. There is a general consensus of opinion on this point, but there is considerable difference concerning the kind of food that is the most pernicious. Fleisher believes that very digestible food leaving a residue that is small and non-irritating tends to produce chronic constipation. Hemmeter claims that this is a very exceptional occurrence.

In considering this question it must be remembered that the feces do not consist entirely of undigested residue. A considerable portion is composed of the secretion of the intestinal mucosa, liver

and pancreas. It is quite possible that a person in perfect health, and in the absence of other causes tending to produce chronic constipation, may indulge in the most digestible diet without bad results.

On the other hand, this diet might produce intestinal atony in a man of sedentary habits, or in a patient suffering from some disturbance of the circulation or nervous system, or in one whose intestinal muscle is already exhausted by an attack of diarrhoea. It is the combined effect of two or more etiological factors that produces chronic constipation. It is very difficult to determine even approximately, how much the unusual digestibility of the diet contributed to the production of intestinal atony in a given case. In certain persons, meat, eggs, cheese, white bread, etc., show a tendency to cause sluggishness of the bowels, and it is customary to ascribe this effect to the digestibility of these articles.

There are two facts that should control our conclusions from these observations:

1. In many persons these foods have no such effect.
2. In some of the cases the very digestible article seems to be just as constipating when taken

with the usual diet. For example, a piece of cheese or a glass of milk taken along with the usual dinner will be followed by a decided impairment of peristalsis. Such cases are not uncommon and they can only be made to harmonize with Fleisher's theory by holding that the cheese or milk rendered the other articles of diet more digestible, and in this way diminished the amount of residue.

Atony of the intestinal muscle not infrequently is found to be the result of fermentation and putrefaction in the bowel. The products of these processes are chemical irritants which stimulate the intestinal muscle violently and unusually. During the continuance of this stormy peristalsis the muscle is overworked, its periods of rest (rhythm) are disturbed, the muscle cells have not received proper physiologic distention and their nutrition is impaired.

The most important factor in the etiology of chronic constipation is the substitution of chemical for mechanical stimuli. The following gives the order of the events that lead to many cases of intestinal muscular atony:

1. The ingestion of unsuitable or excessive food.
2. Faulty digestion.

3. Decomposition with the formation of irritating and poisonous products.

4. Violent peristalsis, diarrhoea, and rapid elimination of toxic material.

5. Intestinal muscular atony and constipation. In this common occurrence one member—the intestinal muscle suffers for the benefit of the whole organism.

The history of many cases of chronic constipation is found to date from a prolonged attack of dysentery or diarrhoea, which must be considered one of the most prominent factors in the etiology. This does not ignore other ways in which diet may contribute to the causation of this disease. The diet with the small residue is undoubtedly a factor.

Trousseau considered that a diet with a relatively large proportion of meat is a common cause of this disease, and he attached the greatest importance to the amount of residue. Meats not only afford but little residue but they furnish a minimum of gas formation, and gas is an important factor in producing distention. Many persons eat too much meat, and atony of the intestinal muscle is not the only ill that results from the excess. On the other hand a certain amount of meat is not only de-

sirable but a necessity for the majority of adults. However, the view held by Trousseau in regard to the effect of meats in the production of chronic constipation is probably identical with that of Fleisher. It is a well known fact that fats play an important role in maintaining a healthy activity of the bowels. In infancy the frequency of stools is controlled by regulating the proportion of cream in the food. The fats tend to stimulate peristalsis. They may do this by stimulating the biliary and other alimentary secretions, or by preventing absorption from the intestine. In certain cases the fat is retained in the bowel and by its presence secures a favorable consistency of the stool.

Accordingly, a diet deficient in fats has a tendency to produce chronic constipation. The newer physiology teaches that fats facilitate the digestion of starches in the stomach. The deficiency in fats may be responsible for the amylicious dyspepsia which in turn may cause the formation of products of decomposition and chronic constipation.

A very common defect in diet is a deficiency in the coarser foods. When the succulent vegetables such as turnips, squash, carrots, parsnips, etc., are excluded from a diet, and the cereals used only

after a perfect removal of all the outer covering, the tone of the intestinal muscle will be reduced below normal.

Many people partake of water too sparingly, and there is a belief based on clinical observation that this is a common cause of chronic constipation. A comparatively large number of these patients have no inclination to drink water, and it is only by an effort that they can manage to consume a normal amount. Water drinking is considered a habit, but how far this habit depends upon Physiologic or pathologic conditions is not known. It is quite possible that the disinclination of these patients to drink sufficient water may be the result of the pathologic condition of the intestines.

About seventy per cent of normal stool is water, so the effect of a deficiency in the amount of water ingested is evident. Recent physiological investigations have demonstrated that much of the water of the internal contents is excreted by the mucosa of the intestinal tract and the accessory alimentary glands. The amount of water in the stool will depend upon the amount of water absorbed by the intestinal mucosa, and the amount of water excreted

by the intestinal mucosa and accessory glands. Excess in this absorption or deficiency in this excretion will diminish the amount of liquid in the excrement from the bowel. Under such circumstances there would be a sluggishness of the bowels, and the ingestion of a normal amount of water would surcharge the system with liquid.

This offers a plausible explanation of the distaste, the actual inability, of many of these patients to consume a normal amount of water. There are other circumstances that have a bearing on the disposition of the water ingested. The quantity of water eliminated by the skin and kidneys varies greatly. When these organs are very active the proportion of water eliminated by the bowel must be decreased. A comparatively large amount of water is eliminated by the skin in one person, by the kidneys in another, and by the bowels in a third. These variations occur among persons under the same conditions and in the same environment. The elimination of abnormally large quantities of water by any of these organs may be a vicarious function serving the best interests of the organism. For instance when semifluid feces are retained in the colon for an unusual length of time, rapid absorp-

tion of the liquid constituents is generally a conservative process. If this did not occur there would be a generation of dangerous quantities of toxic material in the colon. However, where the mucosa is normal there is a rapid absorption of the liquid from the bowel. This liquid is eventually eliminated by the kidneys or skin.

In patients suffering with atony of the colonic muscle this excessive absorption goes on over and over again or possibly, continuously for months and years. In fact excessive absorption becomes a habit of the intestinal mucosa. Here then is an instance of a process which was beneficial in the beginning becoming pathologic. The increased amount of water ingested by such patients is immediately absorbed, and the tissues are loaded with an excess of liquid. The deficiency of water consumed is partly the cause and partly the result of the intestinal atony. Accordingly it is a common error to attach too much etiologic significance to deficiency of liquids in these cases.

Worry and severe mental work are well-known causes of chronic constipation, and a similar factor is the voluntary resistance to and suppression of the inclination to go to stool. This inclination is

recognized when the accumulated fecal mass has reached sufficient proportions to cause stretching of the sigmoid and rectum.

According to O'Byrne, stimulation applied at the rectosigmoidal junction has a special effect in producing peristalsis and defecation. However, voluntary contraction of the levator ani and of the external sphincter is sufficient to effectually oppose the onward movement, and it is generally believed that after a time antiperistalsis begins and the fecal mass is carried back into the colon. As soon as this occurs the inclination to defecate ceases, and does not recur again until the distention is again applied at the rectosigmoidal junction. In the meantime the volume of the fecal matter is greatly diminished by absorption. Accordingly, when in this way the act of defecation has been postponed, it may be many hours before it returns. In fact, it generally does not recur for twelve or twenty-four hours, that is, until a fresh supply of waste material has been swept into the sigmoid. It is not so much the intensity of the mental endeavor as its uninterrupted continuance during the wakeful hours, that is responsible for the production of chronic constipation.

ETIOLOGY OF CONSTIPATION. 77

The person thus occupied may be oblivious of the demands and importunities of a loaded sigmoid, or becoming cognizant of them may ignore and suppress them. This is an important cause of chronic constipation.

Bodily inactivity is another cause of this disease. According to Hemmeter it produces this effect in three ways:

1. By decreasing the movements of the diaphragm.
2. By impairment of circulation in the intestines.
3. By diminished gaseous metabolism.

It is a well known fact that persons who change their occupation from one with much bodily activity to one necessitating much brain work, have a tendency to develop chronic constipation. This is especially common among young men who abandon agricultural pursuits and apply themselves to various urban occupations in which advancement and environment require a great reduction in the amount of physical exercise. But in such cases there are many factors to be considered, and the chronic constipation must not be ascribed too readily to the diminished bodily exercise. For in-

stance this change from the farm to the city, usually brings a complete change in diet. Then in this class of patients it is not only a change from physical to mental work, but frequently to excessive mental work, which as we have seen may be a very important etiologic factor. From our own observations we are led to believe that this disease is as prevalent among laborers, farmers, etc., as it is among those who lead a more sedentary life.

The ill-advised use of cathartics is frequently responsible for the production of intestinal muscular atony. Cathartics are among the most valuable remedies in the pharmacopeia. Their therapeutic action is prompt and reliable, but their persistent use especially by persons inclined to sluggishness of the bowels has a pernicious effect upon the intestinal muscle.

The evil effects from cathartics are produced in very much the same way as they are from indigestible and fermenting foods. The bowel is exhausted by the overwork, the excessive flow of secretions from the bowel is followed by a reaction which continues for several days during which there is insufficient secretions, and for a length of time the bowel muscle is deprived of the normal distention

necessary to the maintenance of proper tone. It is a matter of direct observation that the intestines of dogs that have undergone severe catharsis respond but feebly or not at all to normal stimuli.

Examination of the rectum and sigmoid within twenty-four hours after the action of a cathartic, reveals much congestion of the mucous membranes, engorgement of veins, and considerable mucus adherent to the rectal valves. This congestion may follow from the irritation of the mucous membrane, or it may arise from the obstructions of the veins in their passage through the intestinal muscle which under the stimulation of cathartic drugs contracts with abnormal force.

In addition to this there is probably an unusual prolongation of each contraction, a condition bordering on enterospasm, to which also are due the concomitant pain and tenesmus. Such activity of the intestinal muscle obstructs the intestinal veins, increases the blood pressure in the villi and in part may account for the excessive secretions into the lumen of the bowel. Unfortunately when patients begin to suffer from atony of the bowel they usually resort to the use of cathartics. In this way relief is promptly obtained, but as constipation and the other

symptoms return, recourse is had again and again to the same source of relief. Under this treatment the intestinal atony becomes more and more aggravated and very drastic remedies are required to produce the same effect. The patient eventually finds himself a slave to the medication. It is a drug habit differing, however, from such addictions as the morphine habit, in that the drug is taken to keep in operation a physiologic function of vital importance.

Another feature of interest in this connection is, that after the use of a cathartic for a length of time it begins to fail to give relief. It is said to be worn out for this patient. Larger doses may serve a little longer but eventually another drug must be substituted. In other words, when a patient's bowels become habituated to a cathartic, it no longer is effectual. A new remedy gives results for a time and then becomes inert for that patient. In the meantime the intestinal atony grows steadily worse. One interesting conclusion that seems to follow from these facts is that the bowel has the capacity to acquire a tolerance for any of a great variety of cathartics. This would seem to verify a conclusion reached in the previous chapter, viz., that chemical

irritation is not the normal stimulus of intestinal peristalsis.

In patients that are confined to bed for a length of time the free use of cathartics often produces a very intractable intestinal atony. In these cases there is usually a combination of three factors all disposing toward chronic constipation, insufficient bodily exercise, a diet that affords but little residue, and the continued use of cathartic medication. We have found a number of patients that date their chronic constipation to some illness that necessitated their confinement to bed for a few weeks.

The measures to empty the bowel preparatory to major operations are sometimes unnecessarily drastic. This impairs the intestinal tone and may be responsible for some of the untoward results that follow operations, and in addition to this the atony may become chronic. In this connection it is well known that the pernicious effects of different cathartics differ greatly. Olive oil and similar laxative remedies are the least harmful. On the other hand the acrid cathartics have a most injurious action. Of the cathartics in common use none, perhaps is followed by a greater congestion of the intestinal mucosa, or a greater loss of tone than is

aloes. The saline cathartics are followed by a milder reaction.

Whatever has been said here in reference to the effect of cathartics in producing intestinal muscular atony, does not apply to cases in which there is no tendency to this condition or to cases in which other causative agents are absent.

In recent years enemata of water are used by patients who have learned the pernicious effects of cathartics, or have found these ineffectual. These injections greatly aggravate the condition and tend to result in complete atony.

Summary of causes producing intestinal muscular atony:

1. The impositions arising in human life from individual and social progress.
2. Voluntary or involuntary suppression of the inclination to evacuate the bowels.
3. Improper diet.
4. Insufficient ingestion of water.
5. Bodily inactivity.
6. Ill-advised use of cathartics.

A study of these primary etiological factors reveal at least one common feature, viz., an interference with the normal periodic distention of the bow-

el. The distention is either excessive or deficient or irregular, or some other stimulus has been substituted for distention.

Some of these agents cause unnatural irritation in the intestine and this results in violent and prolonged contraction which is followed by exhaustion and depreciation in the muscular tone of the intestine. The factors just enumerated are some of the more manifest causes of that form of chronic constipation due to uncomplicated atony of the intestinal muscle, and these same factors must be considered as part of the etiology of subsequent pathological conditions that often develop from this initial disease.

This leads to the consideration of the etiology of the group of cases in which the chronic constipation is due to intestinal atony associated with and maintained by other diseases of the gastrointestinal canal. It is well known that many diseases of the intestine are associated with chronic constipation, either as cause or effect; the exact relation has been found difficult to ascertain.

The following are some of the diseases of the intestine which impair its tone and in this way are causes of chronic constipation.

1. Intestinal neurosis.
2. Dyspepsia.
3. Chronic colitis.
4. Intestinal neoplasm.

Of intestinal neurosis very little is known. Following Ehrmann's view of peristalsis, Hemmeter suggests that enterospasm is the simultaneous contraction (spastic) of the circular and longitudinal intestinal muscularis, due either to an increase in the irritability of those fibres of the splanchnics and of the vagus which cause contraction or to a decrease in the irritability of both sets of inhibitory fibres. Enterospasm is usually found in patients who suffer from neurosthenia, hysteria, or other disease of the nervous system, or it is found associated with lead poisoning or colitis.

Nothnagel does not consider it an independent disease but merely a phase of a general pathological condition. Sometimes the whole intestine is affected by the spasm, but more generally a portion of it. The contraction is spastic and in a severe case converts the intestine into a cord-like body with its lumen obliterated.

The contraction is generally accompanied with pain, and always with constipation which in most

cases persists between attacks. During a spasm there is occasionally vomiting. A typical case came under our care recently. The patient was a man of a low order of intelligence, thirty-five years of age, a laborer, under sized, and somewhat emaciated. He was sent to us by his family physician on account of a very persistent constipation which was associated with and apparently the cause of the colicky pains. Five years previously the patient had an attack of dysentery and since that time he has suffered with chronic constipation. Two years ago he began to have very severe abdominal pain. For several days there would be no evacuation of the bowels, and then the pain would begin, persisting with occasional intermissions for several hours or if not relieved for a day or more.

During an attack he would have several small evacuations. This pain was so severe that during its acme he would cry out, and assume an extreme flexed position of the body. During an attack the abdominal muscles were rigid and there was considerable tenderness over the whole abdomen. The temperature was normal, pulse somewhat accelerated, perspiration profuse, face pinched and pale.

Proctoscopic examination made during an at-

tack between spasms revealed an abnormal redness of the mucosa. With the patient in the knee-chest position inflation of the rectum was imperfect; this was due undoubtedly to the contraction of the muscular fibres of the bowel. After a thorough evacuation of the bowels the pain would cease and he was able to resume work for a week or longer. In this patient the chronic constipation preceded the enterospasm by three years and would therefore appear rather as a cause than as a result.

On the other hand it is very probable that the violent spastic contraction aggravated the intestinal muscular atony and thus contributed to the chronic constipation. It would seem therefore that enterospasm and intestinal muscular atony are mutually pernicious, each contributes to the obstinacy of the other.

Indigestion is rarely the cause of constipation, but in many instances the symptoms of the two conditions are found associated. Absence or deficiency of H Cl generally produces diarrhea. The absence of bile does not seem to influence intestinal peristalsis. It is not unusual to find patients who complain of symptoms of indigestion, loss of appetite, discomfort after eating, eructations of

gas, etc., suffering also from constipation. Sometimes the gastric symptoms seem to dominate the clinical picture and sometimes the constipation is the more prominate feature. The relief of the one is usually followed by the relief of the other. However, it is generally the physician's experience that the quickest method of clearing up the whole condition is by producing a thorough evacuation of the bowels, and consequently it would seem that the intestinal atony and fecal retention causes an impairment of digestion. How far the dyspepsia or dystripsia may affect the constipation it is difficult to say. Indigestion may cause chronic constipation indirectly. The food material left undigested ferments, putrifies and forms irritating substances and gas in excessive quantities. These products of fermentation cause abnormal distention and violent contraction, and the result is exhaustion and atony of the intestinal muscle and in some cases a chronic enteritis. The persistence of faulty digestion might develop and maintain either a chronic diarrhea or chronic constipation. Hyperchloridia gastrica seems to be more directly connected with constipation.

There is a very close connection between chronic

colitis and atony of the intestinal muscle. Authorities differ widely in their views of the prevalence, etiology, and symptomatology of chronic inflammatory processes in the intestines. In patients who have suffered for years with diarrhea, constipation, abdominal pain and other symptoms apparently referable to the intestines, post mortem examinations often fail to reveal any evidence of inflammation. On the other hand, cases presenting very similar or even less severe symptoms of inflammatory disease are found to have had well marked enteritis.

Apparently there is needed more accurate methods of diagnosis to differentiate among intestinal diseases. When chronic inflammatory processes exist in the colon they may be a potent factor in producing and maintaining atony of the intestinal muscle, and in every case of chronic constipation care should be taken to determine the presence or absence of enteritis. The relations of chronic enteritis to bowel evacuations is made the basis of a very suggestive classification by Hemmeter.

In this connection he gives the following clinical types of chronic enteritis:

Type 1. "In this class the patients have but one evacuation in twenty-four hours. It is mostly un-

formed, soft, and of a consistence of putty, the diagnosis is made in these cases by the macroscopical and microscopical examinations of the stool and by the subjective and objective symptoms."

Type 2. "Here we are confronted with the most pronounced constipation, a hard and formed evacuation only once in two or three days. In some cases laxatives are necessary to effect a bowel movement. Mucus will be found in the stool on careful examination."

Type 3. "The cases have several markedly diarrheic movements in twenty-four hours, and may show this condition for months. While in Type 2. the inflammation is limited to a part or whole of the small intestine, in Type 3. we have an involvement of both the colon and small intestine, for in the dejections of this latter type we find the yellow mucous granules described under acute enteritis, epithelial and round cells stained with bile, or a diffuse reaction to bile pigment. Nothnagel explains this diarrhea by assuming an irritation which is exerted upon the inflamed mucosa of the colon by the incompletely digested food and the abnormal products of putrification and fermentation. In this third type the peristalsis is permanently increased."

Type 4. "In these patients diarrhea and constipation alternate, or one may have at various times all three conditions—constipation, normal evacuation and diarrhea."

It may be assumed that the intestinal irritability is well maintained in these cases, for although the essential tendency in all these cases is towards constipation, intestinal putrefaction and fermentation are still capable of producing an increased peristalsis and diarrhea, and in others alternating diarrhea and constipation. The prolonged maintenance of intestinal irritability and diarrhea in certain cases may be due to the fact that only comparatively small portions of the intestine are affected by the chronic inflammation.

Post mortem findings indicate that chronic enteritis is usually limited to comparatively small areas. These patches of inflammation are most frequently found in the rectum, sigmoid and cecum. The irritation from the passage of hard feces produces acute exacerbations in and near the chronically inflamed areas and this in turn ushers in an attack of diarrhea. This is a probable explanation of the alternation of diarrhea and constipation found in many of these cases.

The relation of chronic colitis to chronic constipation is obscure. According to Virchow persistent irritation will produce inflammatory processes in the bowel, and he attached much importance to the trauma caused by hardened feces. The weight of authority does not seem to coincide with this view. It is admitted that hardened scyballous masses may cause considerable trauma to the mucous membrane, but in the absence of other pathogenic factors excoriations and tears of the mucosa are known to heal with wonderful rapidity. However, coprostasis not only irritate and excoriate but they also interfere with the circulation in the intestine and under such conditions healing processes are not so vigorous. In a considerable number of patients who have suffered with chronic constipation for years symptoms of chronic colitis begin to appear—pain and tenderness in the abdomen, mucus in the stool and occasional attacks of diarrhea.

It would seem that a greater proportion of cases of chronic enteritis develop from diarrhea and dysentery. In these cases the liquid feces furnish a most favorable condition for infection and the inception of inflammation. This may account for the relative frequency of inflammation in the cecum.

The material that passes through the ileocecal valve is largely liquid and the slow movement of the cecum permits it to remain for a length of time in this location. If this material is irritating and infective the cecum is exposed to the danger of inflammation.

According to many writers inflammation of the cecum is not an uncommon condition. It is asserted that a large proportion of the cases of catarrhal appendicitis is accompanied with a similar process in the cecum. Operative procedures in this region have been largely instrumental in drawing attention away from the cecum to the appendix. But the fact that the appendix is found to be diseased and to be the main source of the symptoms does not necessarily exclude typhlitis. Nor indeed does the complete cure after the appendectomy demonstrate that the whole disease was confined to the appendix. The post operative rest in bed and the dietetic precautions have effected a cure of the inflammation in the cecum. According to Woods Hutchinson the ceco-appendix is the portion of the intestine where inflammatory processes are most commonly found, he regards it as an evolutionary agent.

When chronic constipation is associated with :

1. Mucus in the stool.
2. Tenderness over the cecum.
3. Fecal tumor in the cecum, and these are persistent, the presence of typhlitis is reasonably assured.

However, the tenderness may arise from the appendix or in some other adjacent structure, and the mucus may result from inflammation in some other portion of the colon.

The differential diagnosis must depend upon the symptom complex:

The conditions surrounding a localized inflammation in the cecal mucous membrane are such that the process is not inclined to result in peritonitis or perforation. Whereas, the narrow lumen of the appendix, the frequent kinks and other anomalies in its position and relations, and the peculiarities of its blood supply all predispose towards the extension of the inflammation to the peritoneum. This view of the frequency of typhlitis does not conflict with the statement of Howard Kelly, "That the appendix is the source of practically all cases of peritonitis limited to the cecal region and is the chief source of generalized peritonitis is now generally acknowledged."

However, cases of localized peritonitis in the cecal region arising from inflammatory processes in the cecum are reported by Reinsinger, Carl Beck, Osler and others. In two cases that came under our notice within a year, there were pericecal adhesions and inflammation with normal appendices. The one was a case of amebic dysentery for which Dr. Tuttle performed appendicostomy. Dense perityphlitic adhesions were found, but the appendix was not involved and appeared normal. The other was a case operated upon by Dr. H. O. Walker. The patient gave a history of a severe illness which came on six years previously, while the patient was in Italy. The nature of this illness could not be definitely ascertained, but it began with diarrhea, which was followed by an intractable constipation. During the last year tenderness developed with pain in the lower abdomen. The area of tenderness could not be very definitely outlined but it was somewhat more pronounced on the right than on the left side. The operation revealed many pericecal adhesions, with an apparently normal appendix. A large gallstone was found in this patient, but there were no adhesions about the gall bladder. The symptoms and history are very suggestive of typhlitis. Ap-

pendicitis is undoubtedly the most frequent cause of peritonitis but in a certain number of cases a colitis leads to a localized peritonitis.

Frequent attacks of constipation which alternate with diarrhea, occurring in conjunction with cachexia and anemia or with unpleasant sensations of pressure and tension in the abdomen, colic-like pains, or a circumscribed sensibility to pressure, indicate an affection of the intestine with a suspicion of malignancy. This is a brief summary of Hemmeter's description of the symptomatology of intestinal cancer. When cancer is situated in the bowel above the rectum, its origin and early development are very insidious, and during this stage chronic constipation is its most constant symptom. In these cases the cancer is a contributory cause of the constipation, and its recognition does not usually occur until the disease has developed sufficiently to produce other and more unmistakable symptoms.

Under the "heading" local causes of constipation Gant gives the following in the order of their frequency:

1. Anal fissure.
2. Ulceration.
3. Stricture (benign and malignant).

4. Polyps.

In one hundred consecutive cases of chronic constipation that were under our care, were two cases of rectal polyp and one of rectal cancer. These neoplasms gave no symptoms other than the constipation. Malignant disease as a contributory cause of chronic constipation is not of transcendent importance, probably not so important as constipation considered as a cause of malignant disease.

Neoplasms, ulceration, and other lesions of the intestine which either by mechanical disturbance or irritating discharges provoke excessive peristalsis, tend to produce atony of the intestinal muscularis and constipation. When painful fissure is situated near the anal orifice, it may contribute to the constipation causing the patient to delay defecation.

CHAPTER III.

ETIOLOGY OF OBSTIPATION.

Definition of Obstipation—Causes of Partial Obstruction—Dilatation—Valvotomy—Misplacement of the Colon—Corsets—Belts—Attitude During Work—Peritoneal Adhesions—Splanchnoptosis—Stricture of the Rectum—Syphilis a Common Cause—Tubercular-Gonorrheal Ulcers—Retroflexed Uterus—Prolapsed Ovary—Floating Kidney—Hypertrophy of the Prostate—The Peritoneum—Constricting Bands—Partial or Complete Occlusion—Acute Angulation—A Clinical Case—Volvulus—Occlusion.

Obstipation is a condition in which there is a partial obstruction to the passage of feces.

In cases belonging to this class there is a tendency towards compensatory hypertrophy of the intestinal musculature, and consequently an intestinal stenosis if developed gradually, may reach a stage in which the obstruction is nearly complete without any other sign than ordinary constipation. In this way it often happens that symptoms of complete

intestinal obstruction are acute in cases of marked chronicity. In the same way, a certain degree of obstruction may persist indefinitely if complete stenosis does not develop, and in these cases the only symptom may be a more or less severe constipation. It will be impossible to enumerate all the factors that cause partial obstruction of the bowel.

The following are some of the more common :

A. Factors within the intestine causing obstruction :

1. Hypertrophy or atrophy of the anal sphincters.
2. Hypertrophy of rectal valves, or rather hardening of these.
3. Angulation and certain forms of enteroposis.
4. Stricture.
5. Intestinal neoplasms.

B. Extra intestinal factors limiting the lumen of the bowel :

1. Displaced or enlarged organs.
2. Peritoneal adhesions.
3. Abdominal or pelvic tumors.

The most common form of obstipation is that in which an abnormal resistance to the passage of

feces is encountered at the anal sphincters. It is found not only in painful and spasmodic conditions, but in cases in which there is only normal sensibility. When anal fissure or inflammation exists, attempts at defecation produce spasm and consequent obstipation.

In certain cases there is found a contracted anal canal with marked atrophy of the sphincters. These cases require the greatest care in performing dilatation. Much force is required, and the hardness and sharpness of the sphincters may easily produce considerable injury. In one case under our care in spite of every precaution dilatation was followed by widespread discoloration. Apparently there is shortening of the atrophied muscle and an increase of fibrous tissue. In another type of case the sphincters are felt to be abnormally large, possibly a true hypertrophy. There is no hypersensitiveness but considerable resistance is experienced when attempts are made to pass rectal instruments, even the insertion of the finger requires unusual force.

The conditions of the sphincters causing obstipation may be classified thus:

1. Spasmodic contraction of the sphincters from painful lesions of the anus.

2. Atrophic changes in the sphincters causing loss of elasticity.

3. Muscular hypertrophy of the sphincters.

Considerable variation exists in the number, size, location and thickness of the rectal valves. When hypertrophic changes take place in the rectal valves there is a thickening of the fibrous tissue, a loss of elasticity, and increased resistance. This is made evident when pressure is exerted upon the margin of the valve. There is a marked difference between the pliability of a fold of mucous membrane with a small amount of muscular and fibrous tissue and a tendon-like band, firm and almost ineffaceable by pressure. In one extreme case upon which we operated the yielding of the fibrous tissue when being cut resembled a tenotomy. This was in a patient who suffered with obstipation for years. The mucosa in this case appeared normal, but there was always considerable mucus in the stool and adherent to the rectal valves. However, from an examination of a great number of cases we are convinced that hypertrophic or other pathological changes in the rectal valves whereby obstipation might be produced is not common.

It must not be too readily assumed that because

relief follows rectal valvotomy that there had been valvular disease. It is quite possible that there may have been therapeutic value in some incidental feature of the operation. This, we are convinced, occurred in some of our earlier rectal valvotomies.

During recent years considerable importance has been attached to misplacement of the colon. These malpositions are described as forms of ptosis although the affected portion of bowel is not always found below its normal level. The condition is generally accompanied by coprostasis. The transverse colon and the sigmoid flexure are the portions most frequently found to be affected. Glenard's impressive description of ptosis of the transverse colon has been followed by much literature on the subject.

Glenard's statement that only the proximal portion of the transverse colon descends has been confirmed by many observers. He ascribes much importance to the kinking which he describes as taking place at the point where the transverse colon is attached to the stomach, by the gastrocolic ligament. While the first part of the transverse colon may descend quite to the symphysis it must resume its normal level and course at this point. Glenard believes that the acute angulation thus formed interferes

with the passability of the colon and is consequently a cause of obstipation.

Curschman describes misplacements of the sigmoid, which he believes to be due to congenital elongation. In this condition the loops of sigmoid ascend to the middle or upper portion of the abdominal cavity. They may be found in front of the liver or in the right iliac fossa. According to Fleiner coprostasis is a cause of displacements of the colon.

Other causes of acquired ptosis are corsets, belts, attitude during work, etc. Some of the most pernicious forms of coloptosis are caused by peritoneal adhesions.

A very large proportion of all cases of coloptosis are accompanied by chronic impairment of the bowel function. However, it is a matter of great difficulty to determine an exact diagnosis in these cases. In the first place, in a number of these patients the coloptosis is a part of a general ptosis of nearly all the abdominal viscera—a splanchnoptosis. Then, in very many cases coloptosis is found in patients that are asthenic with neurapathic and psychopathic symptoms which complicate the diagnosis.

Arniell reports a number of interesting cases in

which the splachnoptosis occurred in phthysical patients, and he takes the view that the same anatomic and physiologic type that favors the development of tuberculosis contains a majority of the cases of splachnoptosis. We believe it is still an open question whether an uncomplicated coloptosis ever causes obstipation.

The reports of cases in which partial obstruction is attributed to kinking or angulation do not furnish sufficient details to warrant a positive diagnosis. Many kinks and angles are normally present in the small intestine and sigmoid, and the kinks in a misplaced intestine do not differ materially from these. If, however, the misplaced colon is fixed by adhesions, or is inflamed, or its muscular tissue weakened by stretching, the displacement may be an etiologic factor of such moment that relief is not possible without the correction of the malposition.

Narrowing of the lumen of the bowel, from whatever cause produces constipation, and as far as this symptom alone is concerned no clue can be obtained as to the nature of the obstruction.

In the majority of cases the constipation from a slowly developing stricture does not materially

differ from that resulting from intestinal atony. Statistics show that syphilis is the most common cause of stricture in the rectum, the next to this is traumatism. To the latter must be ascribed the stricture following operations for hemorrhoids. Rectal stricture sometimes originates from dysentery, but this is said to be very rare. Other causes of stricture of the rectum are chancroidal, tubercular, and gonorrheal ulcers. In the intestine, tubercular ulceration is by far the most common cause of stricture.

There is a general agreement among clinicians that a displaced organ may so press upon the bowel as to cause partial obstruction. A retroflexed uterus, a prolapsed ovary, or floating kidney sometimes seem to act in this way. In the same way obstructions may be caused by hypertrophy of the prostate. Quite often it is found that the correction of the malposition is not followed by relief of the constipation.

The coexistence of displacements of the uterus and constipation is not necessarily indicative of any direct causal connection between them. Indirectly, by producing nervous derangement and general debility, retroflexion of the uterus may be an im-

portant etiologic element in chronic constipation.

No structure of the human organism demands greater attention from the medical profession than does the peritoneum, and of its characteristics probably none is more interesting than its power to form adhesions. These adhesions often serve the most beneficent purpose by walling off abscesses, covering up lesions in organs, forming an exit for noxious substances, etc.

In some cases these adhesions are responsible for some very pernicious conditions. This is especially so when they form sharp kinks in or constrictions of the intestine. These constricting bands may form any place from the stomach to the rectum. In some cases they are broad, affecting a considerable length of the intestine, in other cases they are narrow.

The etiology of peritoneal adhesions is very well known, but why in some cases they should develop in great profusion matting coils of intestine together without any tendency toward the production of obstruction, while in other cases a few cobweb adhesions constrict and obstruct, is not well understood.

The common causes of peritoneal adhesions are:

1. Traumatic irritation.
2. Tuberculosis.
3. Syphilis.
4. Inflammation.

Peritoneal adhesions may cause obstructive limitations of the lumen of the bowel in different ways. Nothnagel, Virchow, Treves and others have contributed to this subject.

1. The constricting bands may consist chiefly of a deposit of cicatricial tissue in the peritoneal coat of the bowel. In these cases there is formed an annular band analagous to an internal stricture from an ulceration of the mucus membrane. The inflammatory process may extend to the intestinal peritoneum from some adjacent organ. The starting point may be cholecystitis, a hepatitis, a splenitis, a salpingitis, or an appendicitis. Virchow believed that irritation in the bowel frequently resulted in local peritonitis. When this occurs it not uncommonly resulted in this kind of constriction.

The clinical course of these external strictures resembles very closely that of internal stricture from ulceration. In some cases the cicatricial tissue occupies all coats, that is, it is both external and internal.

2. The bowel may become adherent to some abdominal organ, or to the abdominal parietes, and as a result kinks may be produced followed by partial or complete occlusion. Such an adhesion may exist for years without causing any impairment of the intestinal function. In these cases complete occlusion may develop slowly, with only an intractable constipation to indicate its presence and progress.

3. Two loops of intestine become adherent and form an acute angulation. Cases of this kind have been reported and described by Treves. This form of constriction is most commonly found in the small intestine. When there is displacement of a portion of the large intestine, adhesions may take place between its loops, and in this way a sharp kink be formed. This, we believe, is found in the sigmoid more frequently than in other portions of the large bowel.

An instance of an adhesion between loops of the sigmoid with sharp angulation and partial occlusion came under our care recently. The patient was a merchant aged sixty-six years. In 1865, during the civil war he contracted dysentery which persisted for several years. Thereafter he remained practically free from any bowel trouble until 1900.

At that time he began to have occasional mild attacks of diarrhea and the passage of some mucus. Gradually the diarrhea gave place to constipation, so that in 1905 when he came under our care he had some difficulty in obtaining regular bowel movements. At this time also he had from six to ten passages each day of blood and mucus. Examination of the upper portion of the rectum was quite painful, however, the proctoscope revealed a healthy condition of the whole rectum. Attempts to pass bougies into the sigmoid were unsuccessful.

At the operation it was found that the sigmoid passed down the left side to the floor of the pelvis, and then turned upon itself sharply and ascended to the brim of the pelvis, where it turned again and descended to join the rectum. The descending and ascending portions formed two very acute angulations, and they were firmly bound together by adhesions. Carcinoma was found in the sigmoid, but the growing difficulty in obtaining a movement of the bowel was undoubtedly due to the adhesions.

4. Inflammation of the mesentery of the colon produces shortening and is the most frequent cause of volvulus. It occurs most commonly in the meso-sigmoid. Mesenteritis (sigmoid) may arise by exten-

sion of the inflammation from adjacent organs or may be primary in the mesenteric glands.

5. Diverticula when inflamed and adherent, fix the bowel and cause occlusion.

6. When the parietal peritoneum forming the floor of the pelvis in front of the rectum becomes inflamed, it produces a constricting band which is capable of producing complete occlusion of the bowel.

This occurred in a patient who applied for relief from chronic constipation. For over a year the cathartics she had received from her physician had been effectual and as she had no other symptoms she was satisfied. However, these remedies began to fail. A digital examination of the rectum revealed a very tight constriction about ten cm. from the anus. It was with difficulty that the tip of the examining finger could be made to force its entrance at this place. In this case the parietal peritoneum was greatly thickened; some fluid was present in the abdomen but there were no adhesions. The peritoneum lining the pelvis was hard and thick as sole leather. From the appearance of the tissue and the ultimate course of the disease we believe the condition was tubercular.

CHAPTER IV.

ETIOLOGY OF COMPLICATED CONSTIPATION.

Pathological Conditions That Cause Constipation—Derangement of Circulation—Venous Hyperaemia—Arterial Anaemia—Cardiac Failure—Pulmonary, Hepatic, or Nephritic Obstruction—Peritonitis—A Clinical Case—Certain Nervous Diseases—Myelitis—Hydrocephalus—Meningitis—General Paresis—Neurasthenia and Melancholia.

It is a matter of wide observation that diseases other than gastro-intestinal have a close relation, probably etiologic, to chronic constipation. These pathological conditions may be classified as follows:

1. Derangement of circulation.
2. Certain nervous diseases.
3. Mental diseases.

Any disease that causes a deficiency of arterial blood in the intestines, or a venous hyperemia, at first produces diarrhea but if long continued or if the venous hyperemia or arterial anemia is pro-

COMPLICATED CONSTIPATION. 111

nounced, constipation follows. Accordingly, we have in certain forms of cardiac failure either diarrhea or constipation due to the deficiency of arterial blood supplied to the intestine.

Similar peristaltic derangement arises from the congestion of the intestine due to pulmonary, hepatic, or nephritic obstruction.

Another disease which interferes with the circulation in the intestine is peritonitis. The blood vessels are obstructed by the inflamed peritoneum. When the venous hyperemia is partial, diarrhea is the rule, when more advanced, constipation. We have just received a brief report of the post mortem examination of a patient that came under our care two months ago. She was a stout woman aged about sixty years. She had a peculiar palor, and complained of shortness of breath which at times resembled asthma. Her pulse was full, regular, and was between seventy and eighty beats a minute. Cardiac dullness was increased, some dullness on percussion over the right lung, and occasionally whistling rales were heard over both lungs. About three o'clock each morning she would be awakened by difficulty in breathing, and general uneasiness. This distress could be relieved by digitalis. Prob-

ably her most distressing symptom was an alternating constipation and diarrhea. In fact she dated her illness from an attack of diarrhea which began ten months previously. In the earlier stages of the disease the diarrhea was persistent then it began to alternate with constipation and eventually the constipation became the most constant symptom.

Post mortem examination revealed the heart to be twice the normal size, left side dilated and enlarged, with a thickening of the mitral valves. Strong adhesions were found here and there over the right pleura. The left pleura contained no adhesions but was congested. Liver, greatly enlarged and congested. Both kidneys were enlarged. Now in this case we have reasonable grounds for believing that the failing compensation in the heart was an important etiologic factor contributory to the diarrhea and constipation, and further as the condition developed, exhaustion and atony of the muscularis became more pronounced, and constipation rather than diarrhea characterized the case.

It is a matter of common clinical experience to find patients suffering from various diseases that embarrass the return flow in the veins, with little or no evidence of increase or decrease in peristal-

COMPLICATED CONSTIPATION. 113

sis. However, it must be remembered that patients are subjected to a change of conditions when disease has progressed sufficiently to produce much anemia or hyperaemia of the intestine. For instance, in lobar pneumonia there is usually sufficient venous obstruction to cause considerable disturbance in the intestinal circulation, and diarrhea, but as an offset to this the patient is in bed with a restricted and easily digested diet and in many cases under the influence of constipating medication.

Certain prolonged nervous diseases, such as myelitis, hydrocephalus, meningitis, and general paresis, are attended with constipation. Very frequently we find neurasthenia, melancholia, and other mental diseases associated with sluggishness of the bowels.

However, it is not known how far these psychoses are instrumental in producing the constipation, while on the other hand the fact that regulation of the bowels always influences favorably the mental condition of these patients would seem to demonstrate the etiologic relation of the constipation. Persons of highly imaginative and artistic temperament, or those in whom the intellect is developed disproportionately are subject to chronic

114 CHRONIC CONSTIPATION.

constipation more than are those of a more sanguine or practical temperament. In this respect also

“Great wits nearly to madness are allied,
And thin partitions do their walls divide.”

CHAPTER V.

DIAGNOSIS.

Necessary Points in Complete Diagnosis—Sources of Information—Inductive Methods of Reasoning—Peristaltic Test Meal—Palpation—Digital Examination—The Essence of Diagnosis—Two Cases of Faulty Diagnosis—Confirmatory Proofs—Conclusiveness and Thoroughness—Ballooning of the Rectum—The Rectal Tampon—Four Facts in Diagnosis—Feces in Differential Diagnosis—Amount, Odor, Color, Consistency, Form and Constituents—Mucus in Stool—Mixed Diet—Blood in Stool—Pus in Stool—Enteroliths—Gallstones—Pancreatic Calculi—Microscopic Examination—Chemical Examination of Feces.

For a complete diagnosis it is necessary

1. To establish the existence of coprostasis.
2. To learn the portion of the bowel affected.
3. To discover the lesion directly responsible for the constipation.
4. To discover other diseases contributing to or complicating this lesion.

116 CHRONIC CONSTIPATION.

5. To ascertain primary causes.

There are three sources of information.

1. Interrogation of the patient from which we learn the subjective symptoms, personal and family history.

2. Physical examination which includes not only palpation, auscultation and percussion, but proctoscopic and sigmoidoscopic examination, and examination by colonic inflation and transillumination.

3. Examination of feces and stomach contents.

The inductive methods of reasoning involved are:

1. Method of exclusion.
2. Method of concomitant variation.
3. Method of difference.
4. Method of agreement.

It is not always an easy matter to diagnosticate chronic constipation. In those cases in which the defecations are habitually and unusually infrequent, the diagnosis is clear, but in other cases in which evacuations are comparatively frequent, constipation may exist. There may be constipation in patients who have two or more liquid stools in twenty-four hours. In some of these cases the diagnosis

requires every resource at the physician's command.

A peristaltic meal often affords very conclusive evidence of the existence of deficient peristalsis. Apples, raisins, berries, or other fruits containing seeds should be administered shortly after a bowel movement. The subsequent stools may be examined, and the length of time for passage through the entire gastrointestinal tract noted. According to Hemmeter, if the length of time is greater than twenty-six hours, constipation exists. However, in any but the mildest cases a much longer time than this will be required.

In many cases the coprostasis will be found in the sigmoid, cecum or rectum. When in the rectum, the accumulated feces may be palpated through the vagina or directly by digital examination of the rectum or by means of a proctoscope. In some patients the fecal mass can be made out by palpation and percussion of the abdomen. A fecal tumor may be distinguished by the fact that indentations made by the examining finger persist and may be recognized by subsequent examinations. Again a fecal tumor is obliterated by thorough catharsis and its true nature exposed.

Having established the existence of constipation and discovered its location we come to the most important part of the diagnosis, viz., the discovery of the morbid condition responsible for the habitual delay in the bowel evacuations. This is the very essence of the diagnosis and upon its accuracy depends the success of any treatment. Before proceeding to indicate some of the more important methods we shall briefly refer to the inductive processes mentioned above.

Some years ago a woman applied to us for relief from a very severe constipation. She was thirty-four years of age, had two healthy children, family history good and from a brief interrogation we found nothing in her personal history or present condition that seemed to throw any light upon the cause of the habitual constipation. Accordingly, we made a rectal examination and were surprised to find a very pronounced stricture. We told her at once that this was the cause of her trouble, that when it was relieved she would be cured.

In our subsequent investigation of this case our original diagnosis was considerably shaken by the discovery of a diffuse chronic peritonitis with bands of adhesions constricting the bowel at several places.

The condition of the bowel immediately above the rectum made it evident that the rectal stricture had never been instrumental in causing the obstipation. Had we borne in mind the absolute necessity of applying the logical canon of exclusion we would not have been guilty of making a diagnosis without a thorough examination of the patient. This was a case of tubercular peritonitis and was remarkable in that the patient had no subjective symptoms other than the constipation. It is very easy to fall into fallacious use of another method of diagnostic reasoning.

A patient suffering from habitual constipation gives a history of a change from an occupation requiring much physical activity to a more sedentary. Shortly after this the sluggishness of the bowels begins. Diminished activity is a conspicuous feature of his new life but it may be a very fallacious induction to infer that this is the cause of the bowel trouble. The mistake rests in not taking into account the other changes that may have occurred at the same time, such as increase in brain work, worry, alterations in diet, any of which may be an important etiologic factor. If this is the case a line of treatment based on the erroneous diagnosis

would be a failure. In order to apply the method of difference to such cases, all the additional phenomena must be eliminated and shown to have no etiologic connection with the constipation.

A patient that came under our care recently gave a remarkable diagnosis of her constipation and diarrhea. She insisted that she had some disease in her lungs and heart and that this was the cause of her bowel trouble. A peculiar sense of weakness and depression in her chest would always precede an attack of diarrhea. This patient died of cardiac failure due to fatty degeneration and failing compensation. It is quite possible that the disturbed circulation may have had an etiologic connection with the impairment of peristalsis. The patient made the diagnosis by concomitant variation, but it is needless to say that it is but the merest chance that such a loose application of this method should furnish an accurate diagnosis.

For instance, when symptoms of dyspepsia vary concomitantly it must not be too confidently concluded that the dyspepsia is a cause of the constipation, for their concomitant variation equally favors the conclusion that the constipation causes the dyspepsia. As a matter of fact neither conclu-

sion may be correct, for they may be both symptoms of some other morbid condition. The method of concomitant variation often affords valuable confirmatory proof. It is only necessary to recognize its limitations.

It has already been stated that a large proportion of all cases of habitual constipation is the result of atony of the intestinal muscle, but as the symptoms in other and more formidable lesions occasionally simulate this morbid condition, it is necessary to make an exhaustive examination in all but the most obvious.

A diagnosis of muscular atony will usually depend on two lines of investigation:

1. The elimination of other causes as far as this is possible.

2. The collection of confirmatory facts.

We find the following system very serviceable:

1. The personal and family history of the patient.

2. An account of the patient's subjective symptoms.

3. Physical examination of the patient with special examination of the rectum and other portions of the bowel.

4. Examination of feces, urine and stomach contents.

The conclusiveness of this method of investigation will depend on the thoroughness of the examination, but at best it will not be a work of supererogation to seek any other facts that may be mustered in confirmation if the diagnosis.

A circumstance which we have observed and which we believe sometimes indicates intestinal muscular atony is the prompt and uninterrupted ballooning of the rectum when the proctoscope is used upon a patient in the knee-chest position. When the muscular tone is normal there are usually some spasmodic contractions to be seen when the air is first admitted. However, the most reliable means of demonstrating the existence of atony of this muscle, is the rectal tampon. A full description of the use of this measure will be reserved for the chapter on treatment.

It is sufficient to say here, that a properly adjusted rectal tampon will induce peristalsis and a desire to defecate within an hour if the intestinal tone is normal, whereas, in the case of atony no effect seems to be produced for a much longer time.

Practically we are accustomed to make our diag-

nosis of intestinal muscular atony rest on four facts :

1. Exclusion of other causes of constipation.
2. Evidence that factors known to produce muscular atony existed at the beginning or during the course of the constipation
3. Absence of muscular contraction when air is first admitted through the proctoscope.
4. Delayed excitation of peristalsis when the bowel is distended by a rectal tampon.

A consideration of the physiology of peristalsis will explain this last test.

Examination of the feces will sometimes give information concerning intestinal diseases that tend to cause or perpetrate muscular atony of the bowel, and is often an important means of making a differential diagnosis. The following particulars should be noted :

1. Amount.
2. Odor.
3. Color.
4. Consistency.
5. Form.
6. Constituents.

According to Hemmeter the amount of feces for the average adult is 170 gms. per diem, but it

may vary greatly and still remain normal. Variations depend upon the following:

1. The kind of food. Vegetable food containing much fibrous tissue or other indigestible material increases the amount of residue, while with a meat diet there is a decrease.

2. The amount of excrement depends to some extent upon the quantity of water ingested.

3. It has been shown that a very considerable proportion of the stool is furnished by the intestinal mucosa in the form of bacteria, epithelial cells, succus entericus, and in addition to these there are the contributions from the pancreas and liver. The activity or sluggishness of any or all of these glands will affect the quantity of feces.

4. The amount of feces varies inversely with the activity of the skin and kidneys.

5. The absorptive power of the intestine seems to vary greatly in different persons and in the same persons at different times. It is a matter of clinical observation that however great may be the amount of liquid ingested, by certain patients it is all absorbed and the dejecta is dry. It would seem that there is an abnormal condition of the mucosa producing increased absorption.

The characteristic odor of feces is due to a nitrogenous compound, skatol, and to some extent to indol. Increase in the odor is due to abnormal putrefaction of proteid and to a certain extent is an index of the length of time the excreta has remained in the bowel. Odors that differ from the normal may arise from cancer, ulceration or other pathologic conditions.

The color of normal feces, when inspissated, is a dark brown, when more liquid, a yellow brown. The most important contributor to the color is the bile. Unaltered bile never occurs in normal feces, but a converted bile called urobilin is a constant element. The longer the feces are retained in the colon, the darker they become. When the food contains much indigestible material, such as husks and skins, seeds, etc., the stool partakes of the color of these. Various drugs affect the color and blood if retained for a length of time colors the feces black. Pus gives a gray tinge to the stool.

The consistency of the feces should be such that it will retain its form after evacuation, while it should contain sufficient liquid to be readily moulded in its passage through the rectum. When there is prolonged retention the liquid constituents are

absorbed, the stool becomes abnormally hard, and is commonly found to be made up of small round masses called scybala.

On the other hand, when peristalsis is abnormally active, the intestinal contents are hurried through the bowel and little of the liquid is absorbed and in this case the dejecta is watery. In addition to this, irritants may cause large excretion from the mucosa into the lumen of the bowel. In regard to form there are several features to be noted.

1. It may contain so much liquid that the form is not retained. This is not normal.

2. It may be round, or nearly so, without irregularities, i. e., normal.

3. Ribbon-shaped or flattened; this is a deviation from the normal which may indicate a stricture or other obstruction. It may arise from very prominent rectal valves. It may be caused by some pathologic condition in the region of the sphincters. For instance ribbon-shaped stools occur in ischio-rectal abscess, polypus, localized proctitis, or hypertrophied sphincters. When the first part of the dejecta is hardened or scyballous and the remainder is of soft consistency, there is some retention, that is, the daily evacuations are not complete.

The information gained from an examination of the constituents of the feces is of great importance.

What examination of the stomach contents is to the diagnosis of gastric disease, analysis of the feces is to the intestinal disease.

The following constituents should be looked for :

1. Mucus.
2. Undigested food.
3. Blood.
4. Pus.
5. Concretions.
6. Parasites.
7. Portions of new growth.

Mucus is found in the stool in quantities varying in size from that of small granules or hard shreds to large masses equal in size to a normal stool. In some cases the mucus is found intimately mixed with the excrement, and distributed evenly throughout the entire mass. In some cases the mucus is stained with bile or other coloring matter of the feces.

The greater number of authorities consider that mucus in the stool is pathonomonic of intestinal disease. Hemmeter gives the different forms in which mucus occurs as follows :

1. A thin covering for hardened feces.
2. Strips or masses that look like membrane.
3. Large quantities constituting nearly or quite the entire dejecta.
4. Small particles intimately mixed with feces.
5. Nothnagel gives another form, small particles of mucus stained with bile.

The presence of mucus in form 1. is very common. It will be noted that the mucus is not mixed with the feces, but is found adhering to the outside. When scybala exist the mucus may be found as a coating for each mass, and may give the impression of an admixture.

When mucus is found adherent to the fecal mass and not mixed therewith, it may be due to irritation of hardened feces and not to inflammation. However this cannot be taken as an absolute dictum, for feces that become constipated above an area affected with catarrh will become covered with mucus during its passage.

On the other hand when mucus is intimately mixed with the stool it indicates chronic inflammation. After the action of an enema or a cathartic, considerable mucus is formed in the bowel. When large amounts of mucus become inspissated in the

bowel an altered mucus is formed which adheres to the mucous membrane, in some cases becoming cylindrical and permitting the passage of feces. When eventually it is evacuated it more or less closely resembles mucous membrane. Its passage is usually attended with much pain.

A part of the food taken in a mixed diet is indigestible, and must normally appear in the stool. Some of it is recognizable in the dejecta; for example, the skins and seeds of many fruits, the husks of cereals, and the fibrous portion of green vegetables. The presence of fat or muscle tissue does not necessarily denote disease of the gastrointestinal tract. It is believed that starch granules in the dejecta always denotes a pathological condition of the intestine.

In inflammatory diseases of the small intestine much undigested food may appear in the stool. In this condition the increased rapidity of peristalsis does not allow sufficient time for digestion. There may be either diarrhea or constipation. But it is well known that a large proportion of the food may appear in the dejecta in the absence of enteritis. For instance it is a common observation to find undigested milk in the stool of infants, and in these

cases it is commonly due to a failure of digestion.

Blood when found unaltered in the dejecta usually indicates a lesion in the rectum or sigmoid, if the quantity is large it may come from the cecum or even from the small intestine. However, when the blood is unaltered it is commonly from the lower bowel. Pus may occur in the feces in such quantities that it is easily recognized. Purulent discharges appear in ulceration, in acute inflammation and when peri-intestinal or perirectal abscesses rupture into the bowel. A mixture of pus, blood and mucus is significant of ulcer.

Intestinal concretions consist of enteroliths, gallstones, and pancreatic calculi.

Liechtenstern enumerates three classes of enteroliths:

1. Stony concretions consisting of three layers, an outer white layer of magnesium phosphate, a yellow layer of ammoniomagnesium phosphate, and a third of organic matter.
2. Concretions less firm consisting of indigestible husks mingled with feces and earthy salts, such as calcium phosphate.
3. Concretions due to the long continued use of insoluble salts, such as chalk, bismuth or magnesia.

Portions of new growth should always be looked for. When they are found they should be preserved and submitted to microscopical examination.

By microscopic examination the presence of the following can be detected: Undigested starch granules, globules of fat, striated muscle fibres, blood corpuscles, pus cells, epithelial debris, crystals of the earthy phosphates and calcium oxalate.

Chemical examination of feces. The reaction of normal feces may be acid, alkaline or neutral.

Frequently the outer layer is alkaline and the central portion acid. Probably the most important chemical test used in the examination of feces is that for the bile pigments, bilirubin and biliverdin, and for the biliary acids. These substances do not occur in normal feces. They all appear under the same pathologic conditions.

CHAPTER VI.

RECTAL EXAMINATION.

Reasons for Careful Rectal Examination—Positions for Rectal Examination—Inspection and Palpation—Extra-anal Depression—Cord-like Condition of Sphincters—Unusual Moisture—Cutaneous Folds—Minute Round Ulcers—Relaxed Sphincter—Digital Examination per Vagina—Digital Examination of the Rectum—The Proctoscope—The Sigmoidoscope.

Chronic constipation always demands a rectal examination. Impaction in the rectum or sigmoid, hypertrophy of the rectal valves and constrictions of the anal sphincters, frequently produce no symptoms other than the constipation, to indicate their existence. There is no way for a physician to make a diagnosis of these conditions without a rectal examination of all cases of chronic constipation.

It is also a matter of clinical observation that even such lesions as rectal stricture and cancer may reach an advanced stage without manifesting to the

patient any symptom other than constipation. In such cases the cancer has developed early or has existed prior to the rectal disease. In addition to these reasons for rectal examination in all cases of chronic constipation, the fact is being recognized that therapeutic agents applied per rectum are most efficacious in these cases, even when the cause of the constipation exists in the upper part of the colon.

For the examination of the rectum there are three positions in which the patient may be placed, the back with thighs and legs flexed, or the left side with thighs drawn up on the abdomen, and in the knee-chest position. Digital examination of the anterior wall of the rectum is most conveniently made with the patient on the back. With the patient on the left side, the remainder of the rectum can be examined. For inspection with the anascope or rectoscope, the knee-chest is required.

Inspection and palpation of the anal region should never be neglected. This examination will furnish a complete diagnosis of hemorrhoids, prolapsed rectum, anal ulcers and fissures, anal abscesses, anal inflammation, etc., but in addition to these, careful examination of this region will frequently afford valuable information which will di-

rect subsequent investigation to the discovery of obscure and more remote lesions.

Extra-anal depression is found in patients that are generally emaciated, however, it is suggestive of atrophic changes in the sphincters. A further characteristic of atrophy of these structures is a cord-like condition commonly found in the external sphincter.

Unusual moisture about the anus indicates inflammation or some form of ulceration. An alteration of the cutaneous folds may arise from perirectal inflammation, ischiorectal abscess or tumor pressing upon the sphincters. Minute round ulcers of the skin near the anus should awaken suspicion of fistula. A relaxed sphincter is found associated with stricture or other rectal obstruction.

A digital examination per vagina will often shed light upon the condition in the rectum. Collections of feces in the ampulla are easily recognized through the rectovaginal wall. Rectal and perirectal tumors, displaced genito-urinary organs, inflammatory deposits and adhesions that affect the rectum may be discovered in this way.

Digital examination of the rectum is sometimes attended with great pain. A ten per cent cocaine

ointment applied to a painful ulcer will sometimes modify the suffering sufficiently to permit an examination. A still better method is the injection into the sphincters of thirty minims or more of a tenth of one per cent of cocaine solution. The examining finger should be well lubricated and passed in a direction forward and upward until above the internal sphincter and then backward and upward. For digital examination we prefer to have the patient first on the back for the examination of the anterior wall, and then to complete the examination with the patient on the left side.

During this examination the condition of the other pelvic organs should be noted. Loss of softness or pliability of the rectal wall may be detected, and abnormalities of the sphincters, areas of tenderness, depressions, tumors, etc., should be carefully observed. It is scarcely necessary to state that certain diseases of the rectal wall cannot be detected by touch.

In the male, the examining finger should palpate the bladder, the prostate gland, the seminal vesicles, and the membranous portion of the urethra.

In the female the pelvic organs may be made out clearly by a digital examination per rectum. By

means of a proctoscope the upper portion of the rectum may be subjected to direct inspection. For this purpose the knee-chest position of the patient is the best. The proctoscope should be inserted at once to its full length, the obturator withdrawn, and a systematic examination made from above downward.

Observation is made of the following:

1. The condition of the muscular structures of the rectum, anal sphincters, levator ani, and circular muscle fibres. The force required to pass the proctoscope through the sphincters may be greatly diminished by requiring the patient to strain. When in spite of this, much resistance is encountered, some abnormality of the sphincters must be suspected. When air is admitted into the rectum and ballooning takes place, the fibres of the levator ani usually may be seen contracting, as also may some of the circular fibres. We believe a prompt and complete distention of the rectum with no sign of muscular twitching indicates atony. In some patients the ballooning does not take place for some time or not at all. This may be due to abdominal pressure, which slowly diminishes, or to some pathologic condition of the rectal wall or from abnormal pressure from some other pelvic structure.

2. The number, location, relative position and resistance of the rectal valves. The method of testing resistance of these structures has been stated in a previous chapter.

It is well to remember that a complete obstruction to the proctoscopic view of the upper portion of the rectum does not necessarily indicate any pathological condition. Frequently feces will be seen resting on the rectal valves. This would seem to suggest their function and also the effect of their pathologic thickening.

3. The nature of the contents of the rectum, i. e., fecal material, pus, blood. These substances may be found in the intervalvular region. Mucus is frequently found adherent to the valves. Any or all of these substances may have come from any portion of the bowel above the rectum.

4. The condition of the rectal mucosa. The normal mucous membrane of the rectum is a pale pink and is uniform throughout except immediately after defecation, when some engorgement of the veins may be seen. In some cases these engorged veins stand out with great distinctness and in marked contrast with the pale mucosa. This condition may be due to venous obstruction if the engorgment is

persistent, and if it is discernable when the rectal walls are collapsed as well as when distended with air.

In congestion the mucosa is a deep red that can with difficulty be distinguished from inflammation. The differential diagnosis must depend on signs other than color. Congestion follows the action of cathartics, the use of aqueous enemata, diarrhea, dysentery, the passage of large masses of hardened feces, etc. In proctitis there is an altered color of the mucosa, with mucus and considerable pain and discomfort if the process is at all acute. In chronic proctitis there is thickening of the mucous membrane, hardening of the rectal valves, and in some cases ulceration. Proctoscopic examination in acute proctitis is generally so painful that it cannot be satisfactorily undertaken. This is due not so much to the tenderness as to the spasm. The insertion of the proctoscope does not seem to give so much distress as its retention. The mucosa is a deep red and there is much mucus which is squeezed into the proctoscope by the spasmodic contractions.

5. Polypi, malignant growths, other tumors, hemorrhoids, internal orifices of fistula may be brought within the field of vision and subjected to

direct inspection. In quite a number of cases a sigmoidoscopic examination may be made without the aid of an anesthetic. It affords information of the condition of the sigmoid similar to that obtained of the rectum by the proctoscope.

For the diagnosis of diseases above the sigmoid, direct inspection cannot be made without exploratory operation, and accordingly we must generally depend upon fecal analysis, physical examination and symptoms.

CHAPTER VII.

CONSEQUENCES AND SEQUELAE.

**Habitual Constipation—Falling Vitality—Neurasthenia—
Dyspepsia—Emaciation—Chronic Colitis—Three Fac-
tors—Appendicitis.**

It is a well known fact that habitual constipation may continue for years without producing any appreciable deterioration in the health of the patient. However, such a fortunate course is exceptional and in the majority of cases more or less well defined pathologic conditions may be traced to it.

Of these it is important to mention the failing vitality of these patients. This is a condition in which no definite lesion can be found, and yet the patient has a low power of resistance and deficient energy. The etiologic connection between this and the chronic constipation is not very clear, and yet the association of the two conditions is so frequent and so intimate that a causal relation seems very probable.

CONSEQUENCES AND SEQUELAE. 141

The autointoxication from the retained fecal material, the sluggish portal circulation consequent upon the deficient peristalsis, and the cathartic medication to which the patient is compelled to resort, any or all of these may be sufficient to make inroads upon the patient's health. These patients exhibit one or more of the following conditions:

1. Neurasthenia.

2. Dyspepsia, deviation from a restricted diet is followed by disordered digestion.

3. Underweight.

(b) Habitual constipation does not directly produce disease of the female genital organs, but coprostasis in the sigmoid and rectum may aggravate disease that already exists in these structures.

(c) Chronic colitis is one of the most important sequelae of chronic constipation. The onset of the former is a matter of common clinical observation and is such that its origin cannot be doubted. It is characterized by:

1. Attacks of diarrhea, alternating with the constipation.

2. Mucus in the dejecta.

3. Dull pain in the abdomen, most marked immediately before and after bowel movement.

4. Tenderness elicited by firm pressure exerted over portions of the colon.

There are three factors connected with coprostasis which may be active agents in the production of chronic colitis.

1. Trauma from the passage along the gut of dry, irregular scybala.
2. Passive congestion in the intestinal wall.
3. The exposure of the colonic mucous membrane to infection.

The last of these is the most important in the cecum, where the liquid material from the small intestine stagnates, affording a favorable medium for the proliferation of micro-organisms, and exposing the mucous membrane for a length of time to irritation and infection. Scratches and tears from the passage of hard and angular concretions are more frequent in the sigmoid and rectum. In this region the solid consistency of the feces prevents infection. In some cases the continued use of drastic cathartics and the ingestion of coarse and indigestible food are additional factors in the etiology of chronic colitis. The inflammation is usually confined to the mucous membrane, but according to Virchow it may extend to the peritoneum.

CONSEQUENCES AND SEQUELAE. 143

With the onset of colitis the patient enters upon a life of chronic invalidism and failing health. The attacks of diarrhea persist for several days and are accompanied with depression. Then follows a period of constipation, which is only relieved after much suffering. However, it is only in the advanced cases of colitis that the patient does not have periods of comparatively good health.

Appendicitis.—It is affirmed by Kelly and other reliable observers that the majority of cases of appendicitis give a history of previous chronic constipation, and it is well-known that those who do not give such a history, may, nevertheless have been so afflicted.

Cases are often met, in which a history of regular bowel movement is given and in which the operation reveals decided coprostitis.

There are two ways in which stagnation in the ascending colon and cecum may cause appendicitis.

1. Infection may begin in the cecum and extend into the appendix. It is found that contraction of the muscles of the cecum closes the orifice of the appendix, while a relaxed and distended cecum opens it. Accordingly, abnormal accumulations in the cecum not only increase the virulence of the in-

fective material, but also favor its passage into the appendix.

2. Again, coprostasis in the cecum and ascending colon may interfere with the circulation in the appendix and in this way it may be an important etiologic factor in the production of appendicitis.

From observation of a large number of cases of chronic constipation we are convinced that it is not an important cause of hemorrhoids. These are two very common conditions, and their occurrence in the same patient is, we believe, generally a mere coincidence. The widespread opinion to the contrary does not seem to be confirmed by a consideration of the conditions. Normal peristalsis is an important factor in the portal circulation, and when inactivity of the intestinal muscle is prolonged beyond what is normal, an excess of blood is permitted to remain in the veins, but it is evenly distributed when the deficient peristalsis is localized. Consequently there is no venous engorgement. On the contrary, it is a matter of common clinical observation that after severe or prolonged diarrhea the hemorrhoidal veins are always congested.

Fecal material may collect in the bowel without in any way obstructing the veins, for the walls of

CONSEQUENCES AND SEQUELAE. 145

the intestine are relaxed and movable and the venous anastomosis abundant.

The only circumstance under which coprostasis can obstruct the venous flow in the intestine is a condition in which the bowel wall is pressed between the hardened fecal material and some structure without.

Engorgement of any of the veins of the portal system is produced by excessive, not by deficient peristalsis.

CHAPTER VIII.

TREATMENT OF CONSTIPATION.

Intestinal Muscular Atony—Rational Treatment—Uncomplicated Intestinal Atony—Intestinal Distention—Other Important Factors—The Removal of Intestinal Irritation—Therapeutic use of Rectal Tampons—Size of Tampons—Methods of Packing—Length of Time Tampon Should Be Retained—The Physiological Action of Tampons—Three Important Requisites—A Suitable Diet Important—Importance of Thorough Mastication—The Importance of Manner and Time of Taking Water—Gas in the Bowels—When a Diet is Harmful—Vegetables—Fruits—Fats.

The life work of the intestinal muscularis is peristaltic contraction, and its stimulus, bowel distention. When this stimulus is excessive, deficient or otherwise improper, it produces an abnormal condition known as intestinal muscular atony. The rational treatment is correction and regulation of the distention. It is the proper modification of this agent that affords the only effectual treatment of chronic constipation.

This rather comprehensive statement requires some explanation. In the first place it refers to uncomplicated intestinal atony. When some other pathologic condition contributes to the intestinal sluggishness, results will be obtained from other therapeutic measures.

Then there are different ways of obtaining a modification of intestinal distention. Notable among these are the various dietetic measures. Also, it must be remembered that the correction of any defect in the patient's manner of living may have indirect but very potent results. Sufficient physical exercise, proper bathing, improvement of circulation, limitation of mental strain, etc., are all important factors in effecting a cure of chronic constipation.

With these explanations, and in the light of the physiology and etiology bearing on the subject, we are convinced that the measures that are effectual in the cure of intestinal atony are methods of regulating intestinal distention.

How can this agent be used as a therapeutic measure?

The first and probably the most important essential is the removal and discontinuance of intes-

tinal irritation. To obtain this, all that is necessary in the majority of cases is to cease the administration of cathartics. While chemical irritation is the predominating stimulus of peristalsis, no advance can be made toward the restoration of intestinal tone. In some cases this is all that is necessary to effect a cure. However in the majority of cases some active measure must be resorted to, for not only is the fecal residue reduced below normal by excessive absorption, but the condition of the bowel is such that it requires a stimulus greater than the ordinary. Accordingly, a well regulated increase in distention is required.

Our confidence in the physiologic and etiologic importance of stretching the intestinal muscle arose primarily from the therapeutic use of rectal tampons. Their action in chronic constipation due to intestinal atony is nothing short of a specific. In a large proportion of cases, cathartics and enemata may be discontinued from the first. The insertion of a rectal tampon is not attended with any difficulty for the physician, and with little or no discomfort to the patient.

For the tampons we have used absorbent cotton, cheese cloth, or lamb's wool. It should be sufficient

in size to cause some distention of the bowel. If it is made long and narrow, it is easily inserted through the proctoscope, and may be rolled upon itself so as to give the desired amount of distention. It can be inserted through the ordinary proctoscope and packed into place with a long forceps. We have found that when it is placed above the valves and made to distend the gut near the recto-sigmoidal junction the best results are obtained.

Each tampon is provided with a piece of cord to facilitate its withdrawal. The size of the tampon and length of time it should be retained depend upon the degree of atony. From two to six hours are generally sufficient. If a tampon is used between two and three in the afternoon and withdrawn at seven or eight in the evening, a constipated movement will generally occur on the following morning. The efficacy of the measure is early made manifest by the fact that many patients have a bowel movement also on the second morning. In the majority of patients a tampon should be used on alternating days and, as progress is noted, the length of time between treatments increased. In the majority of cases from six to ten treatments are sufficient.

We are encouraged to present this therapeutic

agent to the medical profession on account of the following considerations:

1. Prompt and uniformly good results in more than one hundred cases of chronic constipation treated by rectal tampons. A number of these were treated four years ago and there is no recurrence.

The treatment was ineffectual in a patient suffering from some nervous disease resembling locomotor ataxia. In another patient with considerable tenderness in the region of the uterus and ovaries, rectal tampons failed to relieve the constipation. In a patient suffering from what seemed to be an inflammation of the valvular region of the rectum, the tampon produced regular movements for a few weeks, but the chronic constipation showed a tendency to recur. In another patient the chronic constipation, which had been of a great many years' duration, had become aggravated since a severe illness six years ago, and within the last two years was accompanied by considerable pain and tenderness in the right side of the abdomen. In this case the rectal tampons failed. A diagnosis was made of partial obstruction due to adhesions. The operation revealed many adhesions, involving the cecum and ascending colon, and although it was not possible to

TREATMENT OF CONSTIPATION. 151

determine the amount of obstruction, the condition was such as to confirm the diagnosis.

Our experience with cases of this nature has led us to believe that when chronic constipation does not yield to treatment by rectal tampons, there is some condition other than intestinal atony present.

2. Muscle stretching by rectal tampons is a measure directed toward the immediate cause of the chronic constipation.

3. That distention is the physiological stimulus of intestinal peristalsis has been already referred to, and that the intestinal muscularis owes its very origin and development to this same agent. (*Vide* Chap. 1.)

4. Muscle stretching is a well known therapeutic measure. Its power of stimulating contraction has long been known to the medical profession, especially in the use of vaginal and uterine tampons.

The distention of the stomach during gastric lavage is a powerful therapeutic agent for the cure of atony of the gastric musculature.

The distention of the blood vessels when saline transfusion is used, may very probably operate in a similar way, increasing blood pressure by stimulating vascular and cardiac contractions.

5. When distention is to be used as a therapeutic agent in any hollow viscus, there are three important requisites:

a. That the agent used to produce the distention should produce no other effect that will militate against the desired results. Liquids suit very well for distention of the stomach, and solids for the uterus, and lower bowel. In other words, the agent used must resemble in consistency the natural stimulus. The lower bowel does not tolerate liquids any better than the urinary bladder tolerates solids. In this regard the rectal tampon is justified by its resemblance to the normal stimulus of peristalsis in the lower bowel.

b. The reaction or other chemical characteristic of the agent must not produce abnormal irritation. The fecal material is sometimes acid, more frequently alkaline or neutral. The rectal tampon therefore does not violate this rule. It does not contain any chemical irritant.

c. The amount and duration of the distention should be regulated by the amount and duration of the normal agent of distention. By the use of rectal tampons these two features are directly under the physician's control. Bearing in mind that feces col-

lect gradually in the sigmoid and rectum, we know that physiologic distention continues for several hours before strong peristalsis is induced. Accordingly the tampon should be sufficient in size to cause some distention and should be retained from one to six hours.

6. The rectal tampon compensates for the shrinkage of the fecal mass due to excessive absorption, and also provides the additional stretching required to stimulate the atonic muscle.

7. Rectal tampons may be placed in that portion of the bowel in which distention is known normally to provoke the powerful peristaltic contractions which result in the bowel evacuations, viz., the rectosigmoidal junction.

8. The rectal tampon is a therapeutic agent attended with no danger and little or no discomfort to the patient. In most cases it does not interfere with the patient's occupation.

From a physiological point of view the dietetic method of treating chronic constipation would seem to be superior to any other. If a diet could be so controlled or regulated that a required increase in the amount of residue could be produced, and made to distend the bowel just where desired, this would

be an ideal method of treatment. But this is impracticable, and the dietetic treatment of chronic constipation is successful in but few cases. In the first place, foods with much residue are inclined to produce so much gastrointestinal irritation that they cannot be given for a sufficient length of time to effect a cure, and secondly, the amount of absorption cannot be controlled.

Nevertheless, a suitable diet is an important factor in the prevention and relief of chronic constipation. The diet suitable for these patients is one that leaves a large residue, and the purpose of the increase in the residue is increased distention.

There are two precautions that must be kept in mind.

1. That the diet is sufficiently nutritious.
2. That it is not too irritating.

Before prescribing a diet it is well to consider the patient's experience with different foods. Many of these patients have a practical knowledge of those foods that contain a large proportion of indigestible material.

In addition to this, the patient is in possession of information regarding articles of diet that are peculiarly suitable to his case.

TREATMENT OF CONSTIPATION. 155

There are four ways in which diet may be made to increase the volume of fecal material:

1. By the amount of water it contains. The patient should partake freely of water and other fluids, and of fruits and vegetables containing a large proportion of water. The thorough mastication of food is a very important means of adding fluid to the gastrointestinal contents. It is a matter of considerable importance how and when the water is taken. Water taken an hour before meals is beneficial. Most of these patients get more benefit from cold than from hot water. It is believed that cold water taken on an empty stomach stimulates intestinal peristalsis.

2. By a proportionately large amount of indigestible solid matter in the food, for example, fruits and cereals containing seeds, husks, fibrous and woody material.

3. By a food that produces an increased amount of gas in the bowel. Certain foods are attended with the formation of considerable gas in the intestine and consequently they excite peristalsis by distention with gas. This is a characteristic of foods containing much cellulose. When the gas formation is excessive it is pathologic.

According to Nothnagel it is distention by gas that produces that rather violent peristalsis known as the rolling movement which he considers a transition between normal peristalsis and pathologic. The gases that usually form in the bowel are carbonic acid, sulphuretted hydrogen and marsh gas.

4. By stimulating an increased flow of juices from the liver, pancreas, and the glands of the gastrointestinal mucosa. The laxative effect of figs, prunes, apricots, apples and other fruits may be due in part to their stimulating action on these secretory glands. This action cannot depend entirely upon the large proportion of water they contain for this is relatively small when compared with that taken in other forms. Possibly the oils and fats may owe their action in part to an increase in the glandular secretion that follows their ingestion.

In these different ways diet may be made to increase intestinal distention, stimulate more vigorous peristalsis and improve the tone of the intestinal muscularis, and still remain well within physiologic limitations.

A diet is harmful and should be discontinued if it produces:

1. Diarrheic movements.

TREATMENT OF CONSTIPATION. 157

2. Pathologic peristalsis, such as rolling movements or any visible movements.
3. Abdominal pain.
4. Meteorism.

The cereals such as oatmeal and the preparations of wheat that contain some of the bran are known to be efficacious; also oatcake, whole wheat bread, and bran bread. To many patients these foods are unpalatable and indigestible. This may be overcome by thorough cooking and by the use of cream and butter. Fats in this form add greatly to the palatability of these foods and in addition secure the best possible condition for their digestion.

When the patient is inclined to have amylicious dyspepsia, the quantity of liquid taken with the food should be diminished, for too great dilution of the saliva destroys its digestive value.

The breakfast may consist of well cooked oatmeal or other coarse cereal with cream. To this may be added whole wheat bread, graham bread or brown bread. These may be toasted or not, to suit the taste, but should be accompanied with a liberal supply of butter.

Green vegetables are beneficial in some of these cases. Those that consist of thin flat leaves are

especially desirable, for they furnish a large indigestible residue and are not irritating. Such are lettuce, spinach, beet tops, watercress, etc. The tuberous vegetables are valuable as a diet for these patients chiefly on account of the large proportion of water they contain. The leguminous vegetables, peas, beans, lentils, etc., contain a considerable amount of nitrogenous food and may be given with advantage as part of a diet from which meat is excluded. In some patients they produce an increased gas formation which sometimes acts advantageously by stimulating peristalsis.

Potatoes and other vegetable foods that consist almost exclusively of starch, leave but little residue. They probably favor the formation of carbonic acid gas in the intestine and this is an active peristaltic stimulant. Possibly in the same way sugar may improve peristalsis. Two of these have a reputation for curing constipation, crude molasses and honey.

Many of these patients drink an insufficient quantity of water. Some of them never drink water between meals and very little with their meals. They seem never to be thirsty, and it is only by an effort that they can bring themselves to take the necessary amount. The thorough absorption from the gastro-

TREATMENT OF CONSTIPATION. 159

intestinal tract satisfies the systemic requirements and accounts for the absence of thirst. When these patients attempt to increase the amount of liquid in their diet there is a feeling of satiety because of the rapid absorption. The extra water ingested does not remain in the intestine and consequently it does not accomplish the desired end.

Nor is it afterward excreted by the intestinal glands, but by the kidneys. Not only this, but the drinking of large quantities of water by patients unaccustomed to its use as an article of diet, is followed by considerable distress and disturbance of digestion. In these cases the abnormal absorption is to a certain extent the result of the intestinal atony, and an increased ingestion of water cannot be considered a complete rational treatment.

If, however, a beginning is made toward the restoration of normal peristalsis by rectal tampons or other effective measure, a gradual increase in the liquids is a valuable adjunct in affecting a cure. To begin with, half a glass may be taken one hour before meals and at bedtime, and this may be increased by four ounces each day until two quarters per diem are consumed.

Our clinical experience and a consideration of

the physiological factors involved, incline us to believe that as long as the intestinal muscularis is atonic the increased water ingested will be absorbed and eliminated by the kidneys and skin. When intestinal tone and normal peristalsis are restored, a normal amount of liquid will be retained in the intestine or secreted by its glands. If by any means the intestinal muscular tone can be improved and at the same time an increased amount of water be ingested, there is a most favorable condition for the restoration of the physiological functions of all the structures involved. Just such an improvement in intestinal tone is obtained by the use of rectal tampons, or in some cases by a diet containing a large proportion of indigestible material.

Fruits form a very valuable part of diet for patients suffering with chronic constipation. Their well-known laxative effect is due in part to the large proportion of water they contain. However, many of them contain a considerable quantity of potash and soda, and they all contain organic acid. Apples, peaches, pears and quinces contain malic acid; oranges, lemons, grape fruit, etc., contain citric acid, while grapes contain tartaric acid. These acids unite with the potassium and sodium in the digestive

TREATMENT OF CONSTIPATION. 161

tract, and the resulting salts stimulate the secretion of the alimentary glands. In this way the volume of excrement is increased. Some fruits, such as prunes, figs, dates and apples are especially beneficial as laxatives.

Possibly there is no better laxative for children than stewed prunes. If the skins are removed they may be given to infants of a year old. Another way in which fruits may improve the tone of the intestinal tract and stimulate healthy peristalsis, is by improving the palatability of diet.

The fragrance of fruits arises from the essential oils they contain, and these stimulate in no small degree the gastro-intestinal glands. Unripe and decayed fruit is very injurious, producing severe irritation and violent diarrhea. Especially must this be kept in mind when a diet containing a large proportion of fruit is prescribed.

In some cases a diet consisting almost exclusively of fruit is found to be beneficial. At Montreaux the patient consumes from three to five pounds of grapes a day and many excellent results are reported. This treatment is kept up for at least five weeks and then the amount of grapes gradually reduced and other foods substituted.

An increase in the amount of fat is probably the best dietetic measure for the prevention and relief of constipation in infants. In many cases the frequency of bowel movements forms an indication for the amount of cream to be used in the modification of milk for artificially fed babies. Cream and butter do not seem to have so direct effect upon intestinal peristalsis in adults. Bacon and other meats containing a large proportion of fat, are borne well in some cases, and seem to correct a tendency to constipation.

Olive oil is an excellent article of diet for many of these patients. It has a reputation for these cases in which there is sluggishness of the liver along with bowel inactivity. It is not definitely known how or to what extent the fats influence bowel movements, but it is fairly well established that in some cases they have a favorable action. Three more or less plausible explanations have been advanced.

1. The fats taken along with other foods lubricate the intestinal tract and in this way facilitate the passage of the intestinal excreta.

2. The fat envelopes the starch granules in the stomach and intestine and prevents their digestion.

TREATMENT OF CONSTIPATION. 163

In consequence, decomposition takes place and the formation of carbonic acid, and this gas causes distention of the intestine and stimulation of peristalsis.

3. Fatty substances in the stomach and intestine cause an increased flow of bile and other alimentary secretions.

CHAPTER IX.

CHRONIC COLITIS.

Three Common Sources of Irritation—Cathartics in Colitis Injurious—The Only Purpose of Diet in Catarrhal Conditions—Urgent Necessity of Regulation of the Bowels—Colonic Irrigation Affords Best Results—Action of the Abdominal Muscle—Methods of Improving Their Activity—Cases in Which Massage Is Indicated.

While it is beyond the scope of this work to discuss all the diseases that complicate or contribute to chronic constipation, it seems desirable to give some space to chronic colitis. This condition, however produced, interferes with the regularity of bowel movements, and its treatment is essential to the cure of the constipation when present. In fact, the treatment of the latter must be considered subordinate to the requirements for the colitis. Accordingly one of the most important features of the treatment is the reduction of the intestinal irritation to the lowest possible point,

Three common sources of irritation in these cases are:

1. The use of cathartics.
2. Coarse, indigestible or easily decomposed foods.
3. Stagnation of fecal material in the colon.

When by any of these factors the inflamed area is irritated the patient experiences considerable distress and there follows an increased amount of mucus in the stool. The use of cathartics in simple intestinal atony should be regarded as harmful, but when this is complicated with a colitis they are doubly injurious.

At the onset we believe it is better to abandon any effort to stimulate increased peristalsis by dietetic measures. Any attempt in this direction will aggravate the colitis. Accordingly many of the foods recommended in uncomplicated constipation are contra-indicated when a catarrhal condition is present. In fact, the diet should be regulated with the sole purpose of keeping up nutrition and avoiding irritation of the inflamed area.

The most urgent problem in the majority of cases is the regulation of the bowels. For this purpose, clinical experience within recent years has

demonstrated that colonic irrigation affords the best results.

Aqueous enemata are indicated when diarrhea is present, and olive oil in cases of constipation. The treatment of these patients by oil enemata is recommended by Fleiner, Einhorn, Hemmeter and many other authorities. From four to ten ounces of oil should be injected at bed time and retained all night. The oil should be at body temperature, and should be injected slowly. This is generally effectual in producing a bowel movement on the following morning.

When diarrhea is present the necessity for a prompt and thorough irrigation of the colon is urgent, for not only is there excessive local irritation but there is also rapid absorption of toxins. Accordingly colonic irrigation with warm water or salt solution is indicated.

The aqueous enemata would seem to be recommended in these cases by the fact that they are in harmony with and assist nature's method of cleansing the bowel. However, in cases of constipation, enemata of water are in direct opposition to the condition present, and indeed the results are not so good. In these cases the oil enemata are indicated.

They soften the excreta, lubricate the bowel and gently stimulate peristalsis. The treatment should be given every night for one or two weeks and then at gradually lengthening periods. At the end of the first week we have found that the cure is hastened by the use of rectal tampons. Eventually the use of the oil may be discontinued and the tampons be used for two or three weeks longer. In a number of these cases we have placed two or three ounces of vaseline in the upper rectum and then inserted the tampon. We have found that this procedure gives very good results in mild cases of colitis, and is an excellent and reliable method of securing a movement of the bowels.

We have found the same method of treatment efficacious in spastic constipation. In this condition the administration per orem, of liquid albalene is highly recommended. It may be given in doses ranging from two drachms to one ounce, two or three times daily.

In a number of cases of chronic constipation considerable benefit may be derived from various methods of improving the action of the abdominal muscles.

Contraction of these muscles increases the in-

tra-abdominal pressure, and furnishes massage to the loaded bowel.

There are three methods of increasing their activity :

1. By massage, either by manipulation by the hand or by means of the cannon ball.
2. By physical exercise directed to the development of these muscles.
3. By education of the patient to exercise a proper control and use of these muscles immediately before and during defecation.

To obtain the best results from massage it should be administered by a skilled masseur. It is an art of considerable value that cannot be acquired without some natural capacity and study.

The cases in which the best results are obtained are :

1. Patients who have had insufficient physical exercise for years.
2. Patients with sluggish circulation and faulty nutrition.
3. Neurotic patients.

The manipulations produce some stretching of the muscle and in this way improve its tone, and the circulation is favored by the kneading and

squeezing. Any physical exercise that brings into activity the abdominal muscles may have a beneficial effect in some cases of chronic constipation. However, it is not unusual to find that the condition of many of these patients is worse after a course in a gymnasium. Nor has walking, horseback riding or other form of outdoor exercise given encouraging results.

The great majority of people are ignorant of the fact that the abdominal muscles are voluntary. Efforts to produce their contraction afford but feeble and tardy results, and in some patients there is no visible movement of the abdominal wall. This is not normal and it is a very common pathologic condition among these patients.

Compensation for the inactivity of the abdominal muscles is provided by the diaphragm and by posture at stool. Straining is accomplished not by the action of the abdominal muscles, but by the contraction and descent of the diaphragm and by flexion of the body, the pelvis and chest being flexed on the abdomen. It may be readily seen that this position is the least favorable to any efficient contraction of the abdominal muscles. Passive resistance is furnished by the abdominal fascia and the

viscera are crowded toward or into the pelvis. In addition to this the natural curves of the sigmoid are changed into sharp angulations. Physiologically and mechanically this is incorrect. There should be little or no flexion of the body, the vertebral column should be held erect and the abdominal muscles should act vigorously in conjunction with the diaphragm. In this way intra-abdominal pressure is increased with little or no tendency to ptosis of the viscera, and this pressure facilitates the passage of the excreta from the sigmoid.

In addition to this the voluntary contraction of the abdominal muscles may be utilized to give a very effectual massage to the bowels, and if practiced regularly each day, is a valuable agent in the cure of some cases of chronic constipation.

We may state here that with a little instruction a patient acquires complete control over these muscles so that their response to volition is as prompt and energetic as that of the biceps.

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CHAPTER X.

TREATMENT OF OBSTIPATION.

Involves Great Diversity of Procedure—Obstructions Must Be Removed—Disease of the Sphincter—Four Important Therapeutic Agents—The Most Important is Dilatation—How to Dilate Inflamed Rectal Valves—Best Therapeutic Measures.

The treatment of obstipation involves a great diversity of procedures, some of which it will be unnecessary to discuss in detail here. Whatever the obstruction may be, the cure can be effected only by its removal. In no portion of the intestine is this obstruction found more commonly than in the anal region. Hemorrhoids, fissures, fistula and diseases of the sphincters have been found to interfere with the bowel movements, and the cure of the obstipation is effected by measures directed to the relief of the lesion present.

It is hardly necessary to state that any of these

lesions may be present without disturbing the normal regularity of the bowels. It is important to bear in mind that the co-existence of any of these lesions and constipation does not necessarily demonstrate an etiologic connection. In such cases the relief of the anal trouble will not possess any therapeutic value in the correction of the bowel disorder.

One of the most common, and most important causes of obstipation, is disease of the sphincters. It is not so difficult to trace the etiology to these structures as it is to determine the exact nature of the pathology. That the cause lies in the sphincters is established by the tightness, deviation in size, or other recognizable abnormality. Confirmatory evidence is obtained from the relief that follows the application of appropriate measures to the removal of the condition.

There are four abnormal conditions of the anal sphincters that seem to have etiologic connections with obstipation.

1. Hypertrophy.
2. Atrophy.
3. Irritability.
4. Dislocation.

Any of these conditions may produce such an

interference with bowel movements that their regularity is disturbed.

The first step in the treatment is the removal of any factors that cause or keep up the sphincteric abnormality; such as hemorrhoids, fistula, fissure, anal eczema, irritating discharges, etc.

Of therapeutic agents which directly improve the condition of the sphincters the four following are important:

1. Applications of cold water. For congestion and irritability, sponging with cold water immediately after defecation is of service in relieving the throbbing and has otherwise a beneficial effect. In some cases it is advisable to inject an ounce or two of cold water after the bowels move.

2. In painful spasm, heat is frequently more efficacious than cold.

3. Massage of the sphincter muscles is indicated in conditions of atrophy.

4. In all these pathologic conditions of the anal sphincter, the remedy of greatest utility is dilatation. Whatever may be the explanation of its action, it has been demonstrated clinically that this procedure is a reliable and indispensable agent in the treatment of obstipation due to contracted and irritable con-

ditions of the sphincter ani. Occasionally it has a beneficial effect in some cases of chronic constipation, due to intestinal muscular atony. Some authorities recommend dilation of the sphincters in all these cases as a routine practice. Our experience does not warrant so general an application. In those cases in which there is a pathologic condition of the sphincters, it is not difficult to understand how dilatation relieves the irritation, improves the condition of the muscle, and removes the interference with the bowel movement.

Dilatation may be done forcibly or gradually. Gradual dilatation is obtained with dilators of graded sizes. Beginning with a number four or six, they should be used on alternate days until a number twelve can be inserted without difficulty.

In many cases it is better to dilate forcibly under local or general anesthesia. Tuttle has discovered a method of obtaining local anesthesia which renders the sphincter sufficiently insensible to permit fairly good dilatation. One-half of one per cent cocaine solution is used, and about thirty drops injected at a point one-half inch posterior to the anus, a few drops being carried into the muscle on each side.

TREATMENT OF OBSTIPATION. 175

Whether the anesthetic is local or general, the dilatation should be performed with care in order to avoid bruising and tearing of the mucous membrane or muscle. It may be best accomplished by the thumbs. The stretching should be applied in all directions and should extend to the internal as well as to the external sphincter.

When hypertrophied or inflamed rectal valves cause obstipation, the treatment must be applied directly to these structures. This can be accomplished by means of a proctoscope used with the patient in the knee chest position.

The therapeutic measures that are recommended are:

1. Application of medicaments to the mucosa of the valves.
2. Massage of the valves by means of a long forceps.
3. Section of one or more of the valves.

Silver nitrate solution, one to five grains to the ounce, applied as a spray or on an applicator, is probably the most efficacious remedy in certain forms of catarrhal inflammation of the mucosa.

Solutions of tannic acid, glycerine, ichthyol and other medicaments are sometimes beneficial. When

there is much adherent mucus, rectal irrigation with normal salt solution gives good results.

Massage is used for rigidity of the valves. For this purpose a long forceps protected with cotton serves very well. By this instrument considerable pressure is applied to all parts of the valve. However, the most satisfactory method of treatment for thick rigid rectal valves is section. Various methods of accomplishing this have been devised.

Section may be performed with a knife or scissors. The incision should be made at the center of the valve, and the resisting portion beneath the mucosa severed. As far as the removal of the obstruction is concerned, the extent of the incision in the mucous membrane is of no consequence. When divided, the two portions recede from each other and leave a v-shaped wound.

The writer has used a sharp pointed knife held between the blades of a long forceps. The valve is transfixed and the blade brought out at the free margin.

The valve may be steadied by hooks or ligatures. The latter are passed by means of a Shepherd's hook needle, one on either side of the point selected for the incision. These ligatures are brought out

through the proctoscope and held by the left hand, while the incision is made with a knife or scissors. When the cutting portion of the operation is completed, the ligatures may be utilized as sutures to approximate the mucous membrane on each side and control the hemorrhage.

If there is much bleeding it may be necessary to insert other sutures. These should be of catgut and secured with perforated shot. However, in the majority of cases the hemorrhage is not very active, and may be controlled with tampons. Several tampons should be used, and each should be provided with a string to facilitate its withdrawal. In some cases sutures are not required as there is little hemorrhage and the cut edges of the mucosa are made to approximate when the muscular tissue retracts.

This portion of the rectum is not sensitive and an anesthetic is not necessary. The patient must be in the knee-chest position, and a large operating proctoscope used. Other methods of dividing the rectal valves have been used with success, such as Pennington's clips, Hirschman's elastic ligature, and Gant's clamp.

CHAPTER XI.

AUTO-INTOXICATION.

Self-Poisoning of the Individual—Toxins of the Intestinal Tract—As a Cause of Functional Disorders—Intestinal Prophylaxis—Aperistalsis Produces Toxemia in Three Ways—Excessive Absorption—Putrefaction—Hepatic Torpor—Auto-Intoxication to be Distinguished from Reflex Disturbances Due to Coprostasis.

Auto-intoxication signifies certain processes by which there is a poisoning of the tissues by substances generated within them. The term is not commonly applied to the specific infectious diseases, although the poisons produced by them are endogenous. However, it includes a great variety of poisons, some of which are well known, while others have never been isolated and are only recognized by the symptoms they produce. The factors and processes to which these poisonous substances owe their origin present also a wide diversity and there-

fore it may be advantageous to devote a little space to definition.

Delafield and Prudden in their work on Pathological Anatomy give a very concise classification of poisons, which shows the exact derivation of autotoxic substances.

POISONS:

- | | | |
|---------------|---|---|
| 1. Exogenous | { (a) inorganic—corrosive sublimate,
etc. | { (b) organic — opium, strychnin,
ptomaine. |
| | | |
| 2. Endogenous | { (a) infectious—acute infectious
diseases. | { (b) enterogenic—
formed by bac-
teria in the in-
testinal canal.
(c) histogenic—
formed by the
metabolism of
the body cells. } |
| | { (b) enterogenic—
formed by bac-
teria in the in-
testinal canal. | |
| | { (c) histogenic—
formed by the
metabolism of
the body cells. | |

According to these and other authorities, the two last groups, (b) and (c), are auto-intoxications. This work is more particularly concerned with the enterogenic poisons and, therefore, the present chapter is devoted to a consideration of enterogenic auto-intoxication.

An enterogenic auto-intoxication is a poisoning of the body from the absorption of noxious substances produced in its intestinal canal. While this type of auto-intoxication does not always arise from chronic constipation, yet the two conditions are closely allied and a consideration of the former seems necessary to any comprehensive study of the latter.

People have suffered so commonly from this kind of toxemia, and for so many generations, that there has gradually arisen some popular ideas on the subject and these have been given definiteness by the use of certain terms. The words "biliousness" and "sick headache" are used by the laity to express this condition of enterogenic auto-intoxication.

The judgment of the people on such subjects, formed as it has been, upon long experience and intimate acquaintance with the facts, deserves much respect and is usually significant. The word "biliousness," applied to a group of symptoms including headache, nausea, malaise, etc., indicates the popular view, that there is a derangement of the liver along with that of the gastrointestinal tract.

Investigation has shown that this is in all probability true. That poisons are formed in the intes-

tines and absorbed producing well known symptoms is a fact that requires no discussion here. However, there are many unsettled problems connected with the mode of formation of these poisons. At the very root of this whole subject is intestinal flora.

The importance of intestinal bacteria can be understood to some degree if their number is appreciated; several billions arise and die each day in the normal intestine, and a very considerable proportion of the feces is composed of their living and dead bodies.

Investigation has shown that these bacteria belong to a comparatively few type, and for these the intestine is the natural habitat, the digestive fluids having no injurious effect upon them. Such, for example is the colon bacillus.

However active may be the alimentary glands and however abundant their secretions, the colon bacillus maintains its position in the intestine. The bacillus lactis aerogenes and the bacillus bifidus are also native to the intestine. These bacteria are able to withstand any destructive action the digestive fluids may possess. They are as constant in the intestinal tract as are the pyogenic micro-organisms upon the skin. They proliferate, flourish and die

by billions each day in the intestine of a healthy human adult.

The immunity of these germs against the bacteriacidal influences of the alimentary juices, has probably been developed slowly by the survival of the fittest, natural selection and other biologic processes, while *pari passu*, the organism has developed a corresponding immunity against the bacteria and their secretions. However this may be, the organism and the micro-organism live together in the most intimate relation without injury to either.

This, however, is only a very partial expression of the facts, for there are many observations to confirm the belief that the presence of these bacteria in the intestine is utilized for the advantage of the host. Pasteur, Madam Metchinkoff, Conradi, Kurpjeweit, and others have expressed the belief that the intestinal bacteria are necessary to the life of the individual, and many experiments have been conducted that go far to establish the correctness of this conclusion. Different views are maintained by physiologists as to the exact way in which the intestinal flora contributes to the well-being of the individual.

When it was first demonstrated that a large

number of bacteria are indigenous in the intestine, an explanation was sought as to a possible function they might fulfil. One of the earliest theories was that they assisted in the process of digestion. This view received some support from the fact that these bacilli have the power of producing fermentation and putrefaction in foods; however, there is much experimental evidence to show that, normally, digestion does not depend upon these micro-organisms.

The most interesting theory upon the utility of the intestinal bacteria is that they furnish a defence against pathogenic organisms. Experimental and clinical facts are accumulating which tend to confirm this view.

It has been shown, experimentally, that the bacillus coli communis produces substances that are antagonistic to certain bacteria; it is believed, however, that these substances are as destructive to the colon bacillus itself as they are to other bacteria. In the rectum and sigmoid a large proportion of the colon bacilli are dead; this is said to be due to the bacteriacidal action of the substance they produce.

It is claimed by Conradi that experiments with colon bacilli show that they are inhibitory to the ty-

phoid and paratyphoid germs; his experiments, however, are not considered conclusive. To demonstrate the inhibitory influence of the normal bacteria in the feces of healthy infants, some of the excreta is placed in a closed tube which is placed in a thermostat; it will be found to maintain its normal odor for weeks. This proves that putrefactive bacteria have been inhibited. Altogether the evidence upon this subject is sufficient to convince many physiologists that the colon bacillus forms a strong defence against the pathogenic micro-organisms.

Many virulent germs are taken with foods, such as milk, cheese, meats, uncooked fruits, and preserved foods; millions of bacteria are formed in unsanitary conditions of the mouth and from diseased conditions of the upper respiratory tract, which are swallowed in large numbers.

In individuals with vigorous digestive organs and normal gastro-intestinal juices most, or possibly all of these germs might be destroyed, but in many individuals there is a functional disorder of these organs and so many of the virulent micro-organisms are able to run the gauntlet of these juices; in such cases the obligate bacilli—the coli communis, the lactis aerogene, etc., save the organism from

the ravages of the so-called "wild" germs. Therefore, it is now believed by those best able to appreciate the facts that the bacillus coli communis with other obligate bacteria defend the individual against many severe infections.

Then, again, when these defensive bacteria are greatly increased in number and their secretions absorbed in large amounts there are symptoms of poisoning as well as evidence of intestinal irritation. When they fall below normal in number there is an immediate invasion by pathogenic organisms which generate poisons and produce irritations. Against these the individual has developed no specific immunity. Accordingly, it is manifest that enterogenic auto-intoxication depends to a considerable extent upon variations from the normal of the number of obligate bacteria in the intestine. Of these the most important is the *Bacillus Coli Communis*.

This bacillus is the constant inhabitant of the normal human intestine from infancy throughout life. It is most abundant and active in the colon and lower part of the ileum. As the lower portion of the colon is approached the proportion of dead bacteria increases. In a specimen of fecal material from the rectum, ninety per cent of the colon bacilli

were found to be dead. Cultures from this region show very feeble growth, while those taken from the cecum proliferate rapidly and vigorously.

The colon bacillus has the power of causing fermentative changes in carbohydrates with the formation of butyric acid and gases. It does not originate putrefactive processes in meats or other natural proteids, but if these have already been acted upon by the strict anaerobes, putrefaction is rapidly produced by the colon bacillus. The putrefaction of peptones is also accomplished by this bacillus. Therefore, when large quantities of partially digested proteids are carried to the ileum and cecum and retained in this position for some time there is much putrefaction due to the action of the colon bacillus. This frequently occurs when a cathartic which is only partially effectual, is administered.

The pathogenesis of the *bacillus coli communis* may be divided into that due to its action within and that outside the intestine. To the latter belongs peritonitis, cystitis, pyelitis, pyonephritis, etc.; under the former that with which we are here concerned, there are irritations of the mucosa, diarrhea, and putrefaction with the formations of poisons and subsequent toxemia.

Dr. Turck of Chicago has recently reported interesting experiments with the colon bacillus which indicate a probability that it may be a factor in the formation of gastric ulcer.

The colon bacillus is facultative anaerobic. In certain abnormal conditions it is absent from the intestine e. g. in saccharo-butyric putrefaction due to the bacillus aerogenes capsulatus, and possibly in typhoid fever.

The bacillus bifidus is the predominating bacteria of the intestinal canal during infancy. It is inclined to anaerobic conditions and occupies in the infant a position somewhat analogous to that occupied by the colon bacillus in the adult. At birth the intestinal canal is found to be sterile but within twenty-four hours the meconium contains bacteria. It is not known whether or not the micro-organism is pathogenic.

The bacillus lactis aerogenes is another obligate bacterium. Morphologically it resembles very closely the colon bacillus but in its action it is different, i. e., it produces different chemical substances from those produced by the colon bacillus.

The bacillus lactis is unable to produce indol, and it takes little part in the putrefactive processes,

while its action upon carbohydrates is greater than that of the colon bacillus. It is a very important gas producer, and has a destructive action on milk. This bacillus inhabits normally the small intestine. These two bacilli, the colon and the lactis aerogenes divide the intestine between them. The former, the lower part of the ileum and the large intestine the latter, the small intestine. In so far as each invades the field of the other, its numbers become less.

The bacillus coli communis, the bacillus lactis aerogenes and the bacillus bifidus belong to the normal flora of the digestive tract. It is only under abnormal conditions that they become pathogenic. Many other bacteria have been described as indigenous in the intestine, e. g., a number of varieties of the colon group, but it does not seem necessary to describe them here.

Some of the most severe auto-intoxications are produced by micro-organisms that are not normally inhabitants of the alimentary tract; we believe it is considered doubtful that the bacillus putrificus is a native of the intestinal tract. According to Herter it plays a part in producing a pathologic condition by the formation of excessive putrefaction. This germ has the power of causing putre-

fective decomposition of native proteids. Experiments show that in cultures the bacillus putrificus decomposes peptones forming indol.

Bacillus aerogenes capsulatus. Many important contributions have been made recently to the pathogenic and other properties of this bacillus by Dr. Wm. H. Welch, Dr. C. A. Herter, Dr. A. F. Nuttall, Dr. Flexner, Professor Theobald Smith and others. The researches of these investigators indicate that it is one of the greatest of enterogenic poison producers. It is a putrefactive, spore-bearing, gas producing anaerobic bacillus which may inhabit the normal intestine in small numbers but in large numbers causes intestinal disorder and auto-intoxication.

It has been shown that the substances produced in proteids by this organism are highly toxic. The gases former are CO₂ and H₂. *Bacillus Botulinus* is an anerobic, sporogenous bacillus which produces in the intestine an absorbable poison with a syndrome that has been termed botulism. The symptoms belong for the most part to the nervous system.

The bacillus proteus vulgaris is a facultative anaerobic bacterium that is occasionally found in the

intestine in great numbers. It is capable of producing very severe intestinal trouble. It acts upon proteids with the formation of indol, skatol, and other products of putrefaction. The proteus is one of the most important liquifying micro-organisms that infect the intestinal tract.

Other bacteria of the intestinal canal that may be pathogenic are:

Bacillus dysenteria.

Bacillus alcaligenes.

Bacillus pyocyaneus.

Bacillus prodigeosus.

Bacillus putrificus, diplococcus intestinalis.

Bacillus subtilis.

Staphylococcus intestinalis, pyogenes, albus and aureus.

Streptococcus lacticus and pyogenes, etc.

POISONS FOUND IN THE INTESTINES.

Recent investigations have accomplished much to throw light on the nature of the poisonous substances formed in the intestine, and yet it is clear that some of the most virulent of these have not been isolated and are known only by the symptoms they produce. During the last decade one class of

organic poisons has been definitely isolated and carefully studied. This is the group called ptomaines. The name ptomaine was first used by Selmi, an Italian, who made the discovery. More recently Vaughan and Novy made contributions to the knowledge of the subject.

A ptomaine is defined as a substance formed by the action of bacteria in proteid material. It is basic in character, resembling the alkaloids and making combinations with acids to form salts. All ptomaines are nitrogenous and organic products of incomplete decomposition. It is necessary to their formation that the processes of decomposition be interrupted before the proteid is resolved into inorganic substances.

The bacteriologists have provided us with these facts concerning this very interesting group of substances. The researches of Vaughan and Novy upon tyrotoxicon the ptomaine formed in cheese has furnished the medical profession with a definite type of ptomaine.

The ptomaines resemble the vegetable alkaloids not only chemically but also in their toxicology. According to Bouchard and others they play a most important part in auto-intoxication. He demon-

strated their presence in human feces and showed that they were developed in the intestine. As has been stated above, these alkaloidal poisons are produced by the action of bacteria in the intestine, but they may also be produced by unorganized ferments. A number of different ptomaines have been isolated; of these, most importance has been attached to the diamines, that is, substances containing two amin NH_2 groups.

Another group of intestinal poisons is also formed from the putrefaction of proteids; to this group belong the aromatic series: ammonia, sulphureted hydrogen, indol, skatol, phenol, leucin, etc. These substances are toxic in varying degrees, and it is from the formation and absorption of this group of substances that the common form of auto-intoxication arises.

The presence in the feces of each of these substances has been demonstrated and their formation is a normal process in the intestine. It is only when they are produced in excess or when their proper elimination is prevented that poisoning results. They give the characteristic odor to the normal feces and their excess is recognizable by a characteristic odor.

Much of our present knowledge of the aromatic

autotoxins has been obtained by the researches of Bouchard, Herter and others upon indol. These investigators have demonstrated that indol is:

1. A constant product of putrefaction in the intestine, and that it is absent from the intestine when there is no putrefaction.

2. In those cases in which indol is present in the feces it is found in the portal vein also.

3. Consequently it is absorbed.

4. Indol is not found in the general circulation.

5. In those cases in which excess of indol is found in the intestinal tract, indican is found in the urine.

6. It has been found also that the indican in the urine varies in amount to correspond with variations of indol in the intestine.

Accordingly indican in the urine is now taken as a proof of some intestinal disorder. According to Bouchard indol is changed into indoxyl in the liver and in this form it enters the general circulation, and, therefore its toxic effects are produced by indoxyl. When the indoxyl becomes further oxidized to form the soluble indican, it is excreted by the kidneys. It is not settled how toxic indol is, as by some indol is believed to be nontoxic, while others

ascribe to it a high degree of toxicity. It is known definitely that when indol is formed in the intestine, indican appears in the urine and there are accompanying symptoms of toxemia, and further that the removal of the indol from the intestine by catharsis or other means is followed by the disappearance of indican from the urine and the relief of the symptoms.

In spite of all this the indol may take no part in the toxemia which may be due to absorption of the other products of the putrefaction that produced the indol. It has been demonstrated that the subcutaneous injection of indol does not cause any severe symptoms unless used in large amounts. The contention of others is that the indol, when absorbed, is changed to indoxyl which is highly toxic. However this may be, whether it be the indol or other product of putrefaction that produces the intoxication, the valuable fact remains that the presence of indican in the urine is a practical proof of the presence of putrefaction in the intestine and the clinician is generally safe in attributing some of the symptoms to auto-intoxication.

The other members of the aromatic poisons formed in the intestine are so nearly analagous in

their formation, absorption, toxicity, and elimination to indol that it does not seem advisable to occupy space here with a separate discussion of each.

The products of fermentation differ widely from those of putrefaction; the former produce no true auto-intoxication. Carbonic, acetic, proprionic, valeric, butyric and other organic acids formed by fermentation stimulate and irritate the mucosa, cause flatulence and diarrhea, and interfere with normal digestion; but they are not absorbed in quantities sufficient to cause general poisoning.

It may be well to define fermentation. The word has been used somewhat indefinitely, being applied to various forms of decomposition of organic substances. In order to distinguish fermentation from putrefaction, the former is applied to decomposition of carbo-hydrates and fats, while putrefaction is a name applied to the decomposition of proteids and allied substances.

As above stated, the products of abnormal fermentation in the intestinal tract produce irritation, diarrhea, a catarrhal condition and derangement of digestion, providing a favorable condition for putrefaction. Accordingly, where there is fermentation there is putrefaction. According to Her-

ter the formation of large amounts of fatty acids in the intestine may indirectly produce a sort of intoxication, by withdrawing from the system an excessive quantity of alkali.

Fermentation plays an important part in the diarrhea of infants and in some instances, on account of the small amount of proteid present in the intestine, there is little or no putrefaction. In such cases the stools have no putrid odor. There is usually diarrhea, vomiting, tympanites, mucus in the stool and irritation or inflammation of the skin about the anal orifice. In some of these cases there seems to be a mild auto-intoxication; whether this is due to the absorption of some of the products of fermentation or not, does not seem to be clear.

When these fermentative processes persist in an infant they cause very severe emaciation. We have seen these infants weigh no more when a year old than they weighed at birth, but with ordinary care they live. The fermentative bacteria are commonly destroyed by the increased flow of the alimentary juices which begins at the end of the first year of life. The noxious effects of putrefactive products show a marked difference. When these are at all excessive and persist, the infant's life is in jeopardy,

the poisoning being analagous to that of the vegetable alkaloids.

Fermentation in the stomach and intestine produces alcohol, but it is believed, in quantities far below that which are toxic.

The foregoing is far from being a complete list of the products of intestinal fermentation and putrefaction, but it is sufficient to give an idea of the main groups of poisons concerned in enterogenic auto-intoxication.

CONDITIONS OF INTESTINE FAVORING PUTREFACTION.

There has been given above a brief account of some of the bacteria which normally and abnormally inhabit the intestine and of the processes of fermentation and putrefaction which these bacteria produce. It has been pointed out that under healthy conditions, some of these organisms are indigenous in the digestive tract. Not only are they harmless but are a decided help, forming a defence against the inroads of the more virulent hords of micro-organisms that constantly threaten invasion. Conditions may arise which permit invasion by these foreigners (wild races), and, indeed, under certain

circumstances, the native races—the colon bacilli—etc., are greatly increased in number and vigor and become a menace to the host.

It is the purpose here to devote a little space to the consideration of conditions that favor these untoward occurrences.

The three essential conditions for the development of life are heat, moisture and food; and, as far as these essentials are concerned, there is an ideal field for the propagation of bacteria in the intestine.

The portion of the human organism than comes into the most intimate contact with its environment is the mucosa of the alimentary tract. The epidermis is a comparatively thick and horny covering which separates the external world from the living tissue beneath; this gives a very effectual defence against all antagonistic factors, but it nevertheless renders the absorption of nutrition impossible. Accordingly, an internal lining has been provided, more vulnerable but more protected, and capable of rapidly absorbing suitable material when brought into contact with it.

It is the problem of the race to provide this material (the pabulum) in sufficient quantities for the

nutrition of the whole organism. However, it must not only be sufficient in amount but it must be separated from such substances as might prove destructive to the sensitive membrane through which the nutriment is to be absorbed. It is therefore apparent that the energies of the race are bent upon making the substances along the intestinal tract the most ideal for the support of living tissue.

Now it is a biologic law that the more favorable the conditions are for life and its development, the more intense is the struggle for existence among contending races and individuals. Here then is the exact situation in the intestine. The mucosa must be preserved in a condition to permit the absorption of nutrition for the organism and therefore cannot be provided with horny or calcarious shields of defence. Bacteria develop in great numbers and not only contend among themselves for existence, but menace the life of the host.

The alimentary secretions take a part in the destruction of bacteria but a limitation is placed on the bacteriacid power of the digestive juices, for should concentration get beyond a certain degree the mucosa would be destroyed.

The defence of the colon and ileum against dan-

gerous bacteria does not depend upon the digestive juices entirely but to some extent upon the bacillus coli communis. There is, therefore, a sort of *entente cordiale* between this micro-organism and the individual, which, however, is not sufficiently binding to prevent violent antagonism arising under certain conditions. The situation may be stated in this way; while the individual is in perfect health and the digestive tract in normal condition, the bacteria present in the intestine do no harm, and others are held at bay, but the intestine offers such favorable conditions for bacterial growth that advantage is taken of any alimentary disorder and in a very short time the intestine is overrun by billions of rapidly proliferating micro-organisms producing quantities of deadly poisons.

Faulty diet is one of the most common things that are found to be responsible for the production of fermentation and putrefaction in the intestine. This may be accomplished in three ways:

1. Unsuitable quality of the food.
2. Excessive amount of the food.
3. With admixture of bacteria.

Some consideration has been given to the question of diet in previous chapters, and but little space

will be devoted to it here. It is probably not amiss to recall the fact that auto-toxic substances are produced in the intestine from putrefaction and not from fermentation, and further that putrefaction is a process that affects nitrogenous substances and not starches or fats.

While therefore not advocating a strictly vegetarian diet, it must not be forgotten that recent researches along various lines concur in warning against any excess in proteid food.

Another precaution to be taken especially by those whose digestion is easily disturbed, is to avoid foods that are uncooked, or not recently cooked. Meats, vegetables and fruits, when raw, are very liable to contain large numbers of bacteria. The destruction of bacteria is not the only purpose of cooking, but it is a valuable consideration. It is one of the most valuable resources at the command of a physician to be able to control the intestinal fermentation and putrefaction by modification of the diet. The fermentative bacteria can be inhibited by reducing the carbohydrates. This is manifest by the prompt disappearance of flatulence, pyrosis, diarrhea, etc. In the same way, the malaise, headache, depression and foul odor of the excreta, can

often be dispelled by the exclusion of meat and eggs from the food.

Another well known and important source of fermentation and putrefaction in the intestine is coprostasis. When intestinal stenosis occurs putrefaction and fermentation are marked features. It is believed that the latter takes a part, and a very important part in the production of the characteristic antiperistalsis which ultimately results in fecal vomiting.

According to Bouchard the fatty acids produce very active peristalsis, and it is reasonable to believe that when peristaltic action is rendered completely futile, the same factors would result in a reverse peristalsis. In the later stages of intestinal stenosis the symptoms indicate a very marked auto-intoxication. The complete exhaustion, the rapid weak pulse, the clammy skin and the sudden onset of collapse all suggest alkaloidal poisoning. It has been found also that indican is present in the urine in all these cases.

In chronic cases of intestinal obstruction, that is, in slowly progressive cases, there is abnormal fermentation and putrefaction from the beginning. The stimulation from the fatty acids whips up the

intestinal peristalsis and in this way the bowel movements are kept up until there is almost complete stenosis. Accordingly fecal stagnation tends to rectify itself in this way.

It is a remarkable fact that in fecal stagnation from complete obstruction the vomiting and other symptoms of auto-intoxication, have a prompt and violent onset. So that in a few days the patient is in collapse, while it is a very common observation for a stoppage from constipation to occur and continue for three or four days and longer, with no marked manifestations of auto-intoxication. The difference does not depend upon the location of the fecal collection, for it is well known that the location of the coprostasis may be identical in both cases.

Why, therefore, is it that fecal stagnation from stenosis produces violent symptoms while fecal stagnation from intestinal atony frequently produces no symptoms? Several explanations have been attempted in answer to this question. By some writers the discrepancy is referred to the sympathetic nervous system. This, however, shifts the problem to another field. The question then is, why should the sympathetic nervous system be so violently affected by stenotic coprostasis and not affected at

all by atonic coprostasis? It seems probable that the explanation rests rather in the relative amount of putrefaction and fermentation present in the two conditions.

It is known that a collection of hardened fecal material, so common in the atonic intestine, is not especially favorable to excessive putrefaction. In fact, in such conditions, it is known that even the normal *bacillus coli communis* ceases to proliferate with its accustomed vigor. This, as already pointed out, is in marked contrast to the existence of putrefactive bacteria in stenotic coprostasis. This difference can be accounted for, in part, and probably in toto, by the large amount of liquid present in stenotic cases and the relative dryness of the feces in the atonic.

In chronic obstruction there develops active peristalsis in the portion of the bowel above the constriction, and accordingly the intestinal contents are hurried to this part of the gut, arriving there in quite a liquid condition, little absorption having taken place. This condition is analagous to the compensation of cardiac hypertrophy in aortic stenosis. As the opening diminishes, the material is brought with increasing proportion of liquid.

Another factor also enters into this condition, for as the opening narrows, stagnation increases and with it fermentation and putrefaction producing enormous quantities of poisons and great irritation. Now, the condition in chronic constipation is in direct contrast to this. No increased stimulations have made compensatory changes in the intestinal movements; the liquids are not brought to the seat of the fecal collection, but on the contrary, there is gradual absorption along the intestine; so that when the material reaches the atonic portion it is already approaching a condition of dryness incompatible with luxuriant cell growth.

Therefore, in organic obstruction of the bowel, whether partial or complete there is excessive fermentation and putrefaction; whereas, in uncomplicated atonic constipation these processes are somewhat diminished.

This view is in agreement with that of Herter and other authorities. Notwithstanding the truth of these statements, it is an authenticated fact that chronic constipation is one of the most important causes of auto-intoxication. The conflict between this and the preceding view is only apparent, as a little consideration will show.

Chronic constipation produces auto-intoxication indirectly by :

1. Inducing diarrhea.
2. Necessitating the use of cathartics.
3. Diminishing the normal number of the bacilli coli communis and other protective bacteria.
4. Causing colitis.
5. Producing a sluggish portal circulation and impairing hepatic function.

1. That condition in the intestine in which there is constipation in one part, and diarrheic material in another is not very unusual. Under these circumstances the liquid contents are carried to the atonic portion of the colon, and stagnate, because they are no longer propelled by energetic peristalsis, and at the same time are impeded by the hardened and constipated material already collected there. This forms a culture for fermentation and putrefaction. This particular condition is recognized as a fruitful source of auto-intoxication. It is described by Bouchard and Lauder Brunton and is a matter of common observation among clinicians.

2. The use of cathartic medication frequently brings about a condition resembling the above. When a cathartic is given in a dose which proves

only partially effective, the liquid contents of the stomach and small intestine are hurried along to the colon, only partially digested and with but little absorption. In this liquid condition the material is brought to a standstill and the process of decomposition begins.

3. Cases recorded by Herter and others are cited which seem to prove that a diminution of the colon bacillus as found in chronic constipation, permits the invasion of more virulent bacteria.

4. The important part played by chronic constipation in the etiology of colitis, has been discussed in the foregoing pages. From the very beginning of the inflammatory process, abnormal proliferation of micro-organisms is present. Auto-intoxication is a constant feature of chronic colitis.

5. The experiments of Bouchard, who has contributed more than any other writer to our knowledge of auto-intoxication, demonstrates the important part played by the liver in arresting the introduction of enterogenic poisons, and preventing their entrance into the general circulation. Poisonous substances absorbed from the intestine can often be discovered in the portal circulation, but no trace of them can be obtained in the blood that issues

from the liver. That organ has in some way caused their decomposition and excretion. It is the belief of Bouchard that deranged hepatic function is as important as intestinal disorder in the production of toxemia.

Chronic constipation is probably the most common cause of hepatic torpor. Instead of chronic constipation it would be more accurate to use the term "intestinal muscular atony." There is abundance of clinical evidence to show that when the intestine is abnormally inactive the portal circulation is necessarily sluggish. The rythmical contractions of the intestine form one of the most active forces in propelling the blood along the portal vein. When the blood moves slowly along the portal vein the liver becomes congested and its function is imperfectly performed; and, consequently atonic constipation is a cause of billiousness.

One of the most direct proofs of this is that the production of active intestinal peristalsis will promptly give relief of the billiousness. It is sometimes thought that this relief comes from the evacuation of the bowels, but this is an error; for it has been observed in many cases that the relief begins before defecation actually takes place. Nor does

the relief come from the action of the cathartics upon the liver; for the same prompt indications of relief are obtained from mechanical agents.

This view of the relation between intestinal atony and hepatic torpor provides a reasonable explanation of these phenomena. When the liver is healthy and the portal circulation normal, putrefaction in the intestine may reach a considerable extent without producing auto-intoxication; whereas the processes in the intestine may be normal, and yet, if the portal circulation is sluggish and the liver congested, a mild form of toxemia may result, for there is considerable poison even in the normal feces and a portion of it is absorbed. This, under ordinary conditions, is easily eliminated by the liver. Therefore, notwithstanding the fact that constipation directly diminishes bacteria in the intestine, as well as the amount of their poisons, it is nevertheless necessarily attended by certain phenomena which must occasionally produce excessive fermentation and putrefaction with the generation of toxic material.

Now, when, in addition to this, it is remembered that there is an impairment in the great organ whose function is to separate the nutritious from the nox-

210 CHRONIC CONSTIPATION.

ious material, it will be possible to appreciate how large a part chronic constipation plays in auto-intoxication. Let any clinician enumerate the patients that exhibit symptoms of enterogenic auto-intoxication and he will find in a great majority of them a persistent atony of the colon.

Above, a rather strong contrast was made between constipation and stenosis. The auto-intoxication from the former produces its effects indirectly and is manifested by symptoms that are chronic; while the latter acts more directly and results in acute symptoms.

SYMPTOMS AND DIAGNOSIS.

Certain symptoms of enterogenic auto-intoxication are so obviously the result of intestinal disorder that they are recognized as such by the layman, while others are quite obscure. One important result of chronic auto-intoxication of intestinal origin is gradual

1. Loss of weight.

The patients in whom this symptom is most commonly observed are between thirty and fifty years of age, and, therefore, are at the time of life when, normally, there is an increase in body weight. This

symptom of auto-intoxication has been especially observed by many clinicians and writers. The only proof that can be offered, is that the emaciation is found to occur in these cases so frequently that it cannot be considered a mere coincidence, and other causes have been excluded by the process of elimination. Confirmatory proof is obtained from the fact that in many cases the patient gains weight when the source of the toxemia is corrected.

2. General debility from auto-intoxication.

There is a group of human figures pictured by the hand of a famous Polish artist entitled, "The Struggle For Existence." In a most realistic manner there is portrayed the signs of exhausted tissue, the prominence of bony angles and ridges, the wrinkled and furrowed skin, the sunken eyes, the prematurely grizzled hair, and the expression of a dying struggle in each face. It is improbable that this artist had in mind the intestinal flora and the putrefactive processes and poisons they engender, but, however this may be, he could not have more faithfully portrayed one of the results of enterogenic auto-intoxication.

When there is constant intestinal disturbance and constant absorption of poisons continuing for

years, a man becomes "old at forty." This debility, exhaustion and premature senility is difficult to describe, but it is nevertheless not only a symptom of some significance but a condition of tremendous moment to the patient.

3. Mental symptoms.

Mental depression and other abnormal psychic phenomena are not infrequently the result of chronic intestinal poisoning. The ancient Greeks evidently understood this for they attributed mental depression to a faulty condition of the liver, using the word "melancholy," melan meaning black, and chole, the bile.

A great majority of the inmates of asylums for the insane are constipated, and it is one of the common observations of alienists, that the depressed insane are always promptly improved by a vigorous cathartic.

A man's temper and temperament depend to a considerable degree upon the amount of putrefaction in the intestine and the health of his liver. However gentle, benign and hopeful he may naturally be, a persistent disregard for dietetic laws, the eating of improper and badly cooked foods, the contraction of irregularities of the bowels and the con-

sequent hepatic torpor, will eventually render him irritable in temper, pessimistic and even brutal.

4. Headache is probably the best known symptom of acute auto-intoxication. In fact, this condition is commonly known among the laity, as sick-headache. In the majority of cases it is of the frontal type. Those who have suffered from attacks of this kind of headache for years, can immediately differentiate it from attacks of migraine or neuralgic pain in the head.

5. Malaise is commonly felt by these patients. In some cases it is the immediate effect of the poisons upon the nervous system but in chronic cases it arises from an actual debility.

6. Circulatory symptoms. In the acute cases the pulse is frequently weak and somewhat accelerated. Occasionally there is brachycardia. Palpitation is a symptom in some patients.

7. The skin is always affected in chronic cases. In most cases there is a characteristic darkening, with spots of darker hue distributed irregularly. In acute cases there is often skin eruptions. Of these, urticaria is probably the best known. Acneform conditions develop in some cases; especially is acne associated with fermentation in the stomach. We

are confirmed in the belief that many of the cutaneous affections depend upon intestinal putrefaction by the fact that very frequently their origin and their disappearance correspond with the origin and disappearance of the intestinal disorder.

8. To the symptoms that arise directly from the digestive tract it is not necessary to devote space.

It is well, however, to bear in mind that these symptoms may be entirely absent. The appetite may be good, the bowels regular and the patient free from pain or distress that could be referred to the gastro-intestinal tract. In such cases the diagnosis must depend upon analysis of the stomach contents and examination of the feces. It has already been mentioned that the presence of indican in the urine is of the utmost importance as a diagnostic sign.

TREATMENT.

There are two fundamental rules for the treatment of enterogenic auto-intoxication:

1. To regulate the diet.
2. To secure healthy action of the bowels

The regulation of the diet involves its limitation to a suitable amount and its adaptation to the di-

gestive peculiarities of the patient. In most cases the modification of the proteids presents the most important feature of the dietetic treatment.

Acute cases of intestinal putrefaction sometimes occur as a complication of other diseases, such as intestinal stenosis, acute appendicitis, acute peritonitis, etc. In these cases it is frequently advisable to prohibit any food by mouth for a length of time. In addition to this, if the stomach already contains food it should be syphoned out. The various methods of securing normal bowel movements have been described in a chapter devoted to this subject.

However, when the case is urgent, with marked evidence of putrefaction and fermentation, cathartics are indicated. The remedy to be used depends upon the condition present. Usually in children and not infrequently in adults, castor oil is suitable. It should be given in doses sufficient to be thoroughly effectual. In analagous cases but with evidence of greater virulence in the bacteria present, calomel is to be preferred.

CHAPTER XII.

CLINICAL CASES.

Case No. 1.

Mrs. W., age thirty-five years, married, mother of three children, the oldest of which is ten years of age and the youngest five years. The patient sustained a severe laceration of the perineum at her first confinement which was not repaired until after the third confinement. Her appetite was good, the tongue was clean, and no sign of indigestion. General health good, heart, lungs and kidneys were in normal condition. She suffered from chronic constipation from the time of her first confinement and the repair of the laceration did not benefit the bowel trouble.

This patient was referred to us by Dr. Angus McLean. She reported that her bowels never moved without cathartics or enemata.

Examination of the rectum and colon revealed no obstruction, the sphincters were normal, no enlargement of the rectal valves, and no signs of colitis. We made no changes in her diet excepting to increase the amount of water ingested, by one quart per diem, one glass of this to be taken before breakfast. A rectal tampon was inserted at three p. m. with instructions to the patient to withdraw it before bed time that evening.

She reported the second day following that the bowels had moved three times, once when the tampon was removed and on each of the mornings thereafter, the passage being small and hardened. Similar treatments were given on alternate days for two weeks, and then at longer intervals until ten were given. No cathartics or enemata were given after the first tampon was inserted. Since then she has remained free from constipation. It is now three years and a half since the treatments were given.

Case No. 2.

Miss H. was referred to us for the relief of chronic constipation in May, 1903. Age twenty-five years, appetite good, digestion seemed to be perfect. General health was good and the patient

was well nourished. In 1898 the patient had lobar pneumonia and during her convalescence a diarrhea began which continued for nearly a year, being then followed by a very stubborn constipation which persisted, although the patient's general health improved. When she applied to us she stated that for more than a year she was compelled to take cathartics and use enemata to obtain any movement of the bowels. This is one of the many cases of chronic constipation which we have found to follow diarrhea.

Rectal tampons were used on alternate days for two weeks and then at longer intervals, the patient being kept under observation for a month. Cathartic medication was discontinued from the first as were also the enemata. She began to have daily movements of the bowels but the stool was insufficient in amount and very hard. At the end of one week she was put on tablespoonful doses of liquid albalene taken at bed time. This had an excellent effect on the consistency of the excretions, and the amount also began to increase. After a few weeks the oil was discontinued. This treatment effected a complete cure for this patient.

The intestinal atony in this patient was not complicated by any other condition in the intestinal tract or elsewhere in the system but the atony was complete. She stated that for more than a year she had had no movement of the bowel without the assistance of medication or enemata. Attempts made to get along without these agents absolutely failed. Case No. 3.

Mrs. F., age thirty-three years, married five years. Chronic constipation began in early girlhood, appetite variable, digestion not good. There was a slight mitral murmur, otherwise the chest, kidneys, etc., were normal. This patient applied to us in 1902 for the relief of chronic constipation.

Rectal examination revealed very prominent rectal valves. One of these was especially resistant and undoubtedly produced considerable obstruction.

Treatment: The diet was regulated and massage of the rectal valves given every day for two weeks but very little benefit was derived from this treatment. Rectal valvotomy was performed at Harper Hospital on February 22, 1902, local anesthesia being used. Through the proctoscope two ligatures were passed through the valve about half an inch apart, and the ends brought out and held to

steady the valve, which was then transfixed and severed with a long knife. The ligatures were then tied on the opposite sides of the wound. The rectum was packed with cotton tampons.

The second day after the operation the bowels moved naturally and for more than a year gave very little trouble. The patient then began to be constipated again and rectal tampons were used with decided benefit. Recently she reported that she occasionally resorted to a cathartic, but that her bowel trouble was much better than it formerly was.

After the valvotomy there was the noticeable improvement in her general health and condition. However, she continued to have occasional spells of indigestion and sick-headache.

Case No. 4.

Mrs. D., age 39 years, mother of one child, age three years, was referred to us by Dr. Huson. She consulted us for the relief of chronic constipation January, 1906. Her appetite, digestion and general condition were good; her heart, lungs, and kidneys normal. Constipation began in early girlhood, but had been much more stubborn and persistent since her confinement.

Rectal tampons were used on alternate days for two weeks, the cathartics being discontinued from the first treatment, and she has had regular normal bowel movements since the beginning of the treatments.

Case No. 5.

Mr. H., age sixty-four years, a lawyer by occupation, applied to us for the relief of chronic constipation in May, 1904. Appetite and digestion fair. Heart, lungs and kidneys normal. There was a slight deficiency in nourishment. He had a large practice at which he worked very assiduously; he was of a nervous temperament and was devoted to intellectual pursuits.

In this case the constipation was of thirty-five years' duration; during all this time he had been compelled to resort to laxatives or cathartic medication and to give the closest attention to his diet in order to obtain sufficient bowel evacuation.

Treatment: No changes were made in diet. Rectal tampons were used every second day from May 30, 1904, till June 8, 1904, and thereafter for two months an occasional rectal tampon was used. The last tampon was inserted August 31, 1904. Cathartic medication was discontinued from the be-

ginning of the treatment, and the bowel movements began to be normal and regular. In addition to this he reports the most gratifying improvement in his general condition.

Case No. 6.

Mr. K., capitalist, age 30 years, applied to us for the relief of constipation in January, 1904.

History, brief: Appetite, digestion, and nourishment good, inclined to be corpulent. Heart, kidneys and lungs in a normal condition. He had suffered from chronic constipation for about ten years, beginning during his college days. It was steadily growing more aggravated and troublesome and rendered him very uncomfortable and, at times, very nervous and sleepless.

In this case the diet was regulated to three meals a day, the amount of nitrogenous food diminished and a large proportion of fruits and vegetables advised. Rectal tampons were used, seven in all.

The treatment extended over four weeks, cathartics being forbidden. The relief of the nervousness and distress began after the first treatment. He slept well and the constipation disappeared.

This patient consulted us again in November, 1905, at which time he said, "He was much pleased

with the result, and had been free from constipation until the last few days, without any medication." We found that he had been indulging in an unsuitable diet, particularly that he had been eating late lunches before retiring. A rectal tampon was used, and another two days later, and since then his bowel evacuations have been regular and normal.

Case No. 7.

Mr. F., age thirty-eight, manager of a large factory. Very robust, large man. Appetite good, digestion and nutrition good. Organs all in a healthy condition with exception of intestinal atony. His constipation began about six years previously, at the time when his occupation required him to remain indoors for ten hours a day, and his habits at the same time were largely sedentary.

This patient's diet could not be improved, he used neither tobacco nor intoxicating drinks.

Rectal tampons were used; treatments covered about three weeks' time with no cathartic medication, and daily evacuations have occurred ever since.

These treatments were given in 1903, and from that time till 1905 his occupation remained the same, largely indoors and sedentary. For the past

two years he has been out of doors a great part of the time and has done much more walking about.

Case No. 8.

Miss F. T., Toledo, Ohio. By occupation a teacher, age 32 years, consulted us for the relief of chronic constipation in June, 1905. Her appetite was fair, tongue furred; she was troubled with eructations of gas and complained of a sense of fullness in the stomach. She had suffered with constipation since girlhood.

This patient was advised as to the proper method of mastication, the amount of carbohydrate food was diminished and the amount of hydrocarbons increased, especially the butter, bacon and salad oil.

Rectal tampons were used on alternate days and then at longer intervals until ten in all were used. These treatments were given during her school term and in no way interfered with her duties as a teacher.

With this patient, as with many other busy people, we have found that they do not allow themselves sufficient time between rising in the morning and the time when they begin their daily duties, to take proper care of these organs of elimination. Accordingly, in some cases, this difficulty is over-

come by having them rise earlier in the morning, in others by having them establish a regular time in the afternoon or evening, for bowel evacuation.

This patient responded promptly to treatment and has remained entirely free from the constipation.

Case No. 9.

Miss M., age thirty-eight years, teacher by occupation, was referred to us in December of 1905, for the relief of chronic constipation.

Brief history: Appetite and digestion normal, occasional attacks of sick headache, menses normal, complexion sallow, otherwise in fairly good health. The constipation was of long standing, but was slowly becoming more troublesome. She was well informed upon the best diet for her condition and had given much attention to it and to physical culture. In spite of all this she was compelled to take cathartic medication in large doses and with increasing frequency.

The total number of tampons used for this case was six and the treatments continued over three weeks. No changes were made in her diet, reduction in her physical exercise was advised and all cathartics were forbidden,

226 CHRONIC CONSTIPATION.

At first the bowel movements were small, but within a month after her first treatment they were normal. This patient reported to us in April, 1907, that she had no return of the trouble and very rarely had a sick headache.

Case No. 10.

Mr. L., age forty-eight years, employed in a stove factory. Chronic constipation for the past ten years. Appetite failing, but no symptoms of dyspepsia. Occasionally he had experienced considerable distress in the abdomen and pain following the use of cathartics. His occupation required him to be at work at seven o'clock in the morning, with one hour for dinner; the day's work was over at five thirty in the afternoon.

This patient responded slowly to treatment. Rectal tampons were used on alternate days for a time and then for a week they were used every day. Cathartic medication was discontinued from the first tampon treatment although the bowel movements were very scanty and infrequent during the first two weeks. At the end of the fourth week the bowels were moving normally his appetite was improved and he was free from distress.

The treatments were then discontinued, but at

the end of three months he became constipated again. Three tampons were used on alternate days and about five months later he called and reported that he had had no further trouble.

In this case there were several factors that retarded the progress toward recovery. The long hours of work each day interfered with the personal attention the patient required for himself. At noon he had a cold lunch and in other particulars the diet was faulty and he found it impossible to correct it. It is also possible that there may have been the beginning of a localized colitis.

Case No. 11.

Miss B. was referred to us by Dr. Yates for the relief of chronic constipation. Her appetite and digestion were fair; the heart, lungs and kidneys normal and she had the appearance of health. Her age was twenty-eight years and her occupation that of nursing. For several years she had been troubled with sluggishness of the bowels which was becoming more stubborn.

Massage of the rectal valves, various forms of physical exercise and dietetic measures had been tried with only temporary relief.

In May, 1907, rectal tampons were used; no

changes being made in her diet or occupation. After the use of the first tampon she was enabled to dispense with cathartic medication; six tampons were used during the course of her treatment and one month after the last tampon was used she reported at the office that her bowels were regular and normal.

Case No. 12.

Mrs. C., age forty-seven years. This patient had been married twenty years, she was very frail and exceedingly nervous is temperament. For several years she had been under the care of a gastro-enterologist.

She had a fair appetite but she was compelled to adhere to a very restricted diet. Fruits, coarse cereals or vegetables would produce diarrhea and pain. When other foods were taken constipation became very troublesome. For nearly two years she had been given half an ounce of albalene each day, and in addition to this she resorted to the use of enemata two or three times a week.

An examination of the stool revealed considerable mucus and occasionally undigested starch; this, along with other factors, gave a pretty clear picture of a mild form of chronic entero-colitis. The liquid

albaline by mouth was discontinued and at night five ounces of olive oil was given as an enema, to be retained until morning, and rectal tampons were used on alternate days in the afternoon.

These treatments were continued for six weeks, the oil enemata were discontinued at the end of the fourth week. The bowels became regular and normal in their movements soon after the beginning of the treatments, but a certain amount of distress in the abdomen continued for several months. This patient's general health improved, but she remains quite nervous, troubled with insomnia and she is still compelled to be very guarded in her diet. Case No. 13.

Mr. B. D., age forty-four years, by occupation manager of a large factory, was referred to us through the courtesy of Dr. E. L. Shurly for the relief of chronic constipation. The patient's digestive organs seemed to be in a normal state. His appetite being good and he had no symptom of gastric trouble. Kidneys, heart and lungs normal. For the last fifteen years he had been troubled with unusual sleepiness, so that, should he sit in his office or elsewhere without some urgent business to occupy his mind he had to exert himself to keep awake.

230 **CHRONIC CONSTIPATION.**

Ten years ago his weight was 170 pounds, five years later in 1902, it was 190 pounds and at present is 205 pounds. He had been troubled with constipation all his life.

Gradual dilatation of the sphincters which were found to be hypertrophied, was performed; rectal tampons were used on alternate days and cathartics were discontinued. The bowels soon became normal in their movement and the drowsiness diminished; however, there was no marked improvement in the latter respect.

It was thought that the constipation in this case might be responsible for the sleepiness and that possibly there might have been an auto-intoxication. However, we could not take this view of the diagnosis. In fact, we are of the opinion that the sluggishness of the bowels had no etiologic connection with either the obesity or the sleepiness.

We gave him thyroid extract for a few weeks and this seemed to have a decided effect in diminishing the sleepiness, but he complained of nervousness and the medication was discontinued. However, it is probable that there is some defect in the internal secretions.

Case No. 14.

Mrs. L. F., age forty years, consulted us in 1905 for the relief of chronic constipation which had existed for a number of years. The appetite had been good and the digestion normal. She was nervous and suffered from headaches much of the time.

In 1904 she underwent an operation for the relief of retroflexion of the uterus. At that time the round ligaments were shortened and we found the uterus retained in good position. The patient also was much relieved from the dragging sensation; however, the condition of the bowel was not benefited by the correction of the uterine displacement and this the patient states was her chief reason for submitting to the operation.

Rectal tampons were used on alternate days for two weeks and then at longer intervals until ten in all were used. Each tampon was retained about three hours; no changes were made in the diet. She was instructed to drink a glass of cold water before breakfast, and to reserve the early portion of the forenoon for attention to the necessities of the bowels. Cathartics were discontinued and were not required by the patient after the first treatment. At the end of three weeks the bowels were moving normally each day.

232 CHRONIC CONSTIPATION.

Case No. 15.

Miss A. H., age twenty-eight years. She was referred to us for relief of chronic constipation on May 31, 1904. The patient was well nourished and had a good appetite, the digestion, menstruation and other functions normal. The heart, kidneys, lungs were in a normal condition. She had been afflicted by acne and comedones upon the face and back for five or six years and the skin was oily and had a muddy and unhealthy appearance. She also suffered a great deal from headaches and was inclined to be very sleepy during the day. She complained that she could not get enough sleep. Her constipation was very pronounced, not having a movement of the bowels without the aid of a cathartic.

The cathartic medication was immediately discontinued, some slight changes in her diet were made and the amount of water to be taken each day was increased by two quarts. She was carefully instructed to attend to the movements of the bowels after breakfast each morning. Rectal tampons were used on May 31, June 2, June 4, June 6 and June 10. The bowels responded promptly and the cure was complete.

The condition of the skin improved slowly; the acne lesions persisted for a length of time, but the general appearance of the skin was manifestly better. Within a year the acne had disappeared. Most of the time she had used remedies prescribed by a dermatologist but for several years previously these same remedies had failed.

Case No. 16.

Mrs. E., mother of the patient described in case No. 15, applied in March, 1905, for the relief of chronic constipation and anal fissure. She was fifty years of age, emaciated, and appeared much older than the age given. Her appetite was poor, tongue furred, digestion faulty and skin sallow. She said that she had suffered from constipation all her life, and that it had become much more troublesome during the past year, that is, since the anal fissure had developed.

Defecation was very painful, and an examination of the rectum revealed a long painful ulcer extending well up into the anus. The sphincters were contracted and abnormally rigid. They were not only irritable but also atrophic, and consequently the movements of the bowels were very painful. No attempt was made to treat this case under

234 CHRONIC CONSTIPATION.

local anesthesia. She was sent to Harper Hospital April 1, 1905, and under general anesthesia the anal sphincters were dilated by the fingers. The external sphincter was found to be so rigid and cord-like that it was necessary to exercise the greatest care in order to avoid severe traumatism.

The fissure was curretted and its base incised. This treatment gave perfect results. On the third day after the operation a painless movement of the bowels was obtained by the use of an oil enema. It was fully expected in this case that some form of treatment would be necessary after the operation for the relief of the constipation. This, however, was found to be unnecessary, for there seemed to be no tendency to sluggishness of the bowels after the operation.

There were symptoms of intestinal atony in this patient long before the beginning of the fissure or sphincteric atrophy, but undoubtedly the obstruction offered by the contracted sphincters had the effect of relieving the atony. This is an illustration of a physiologic principle that is well known to the profession, viz., that a certain degree of obstruction increases the strength and tone of the intestinal muscle above it.

Case No. 17.

Mrs. M., age 30 years, married in 1903, a nullipara. On July 15, 1907, she consulted us for the relief of pelvic pain. Her appetite was poor, tongue coated and digestion fair. She suffered a great deal from headaches. Her skin was in an unhealthy condition, face being covered with comedones and an acneform eruption. She stated that she had been constipated for a long time and that there was considerable pain in the rectum, more especially after a bowel movement and her menstruation had always been painful.

Examination per vagina and per rectum revealed a tenderness in the pelvis in the region of the left ovary. In fact, the pain and tenderness in this region had become so marked during the past few months that an operation had been decided upon by her physician. This, however, was reconsidered and postponed for a time.

Cathartics and enemata were discontinued and rectal tampons were used on alternate days for two weeks. The patient's bowels began to move normally and regularly which they have continued to do from that time on. The tenderness and pain had completely disappeared by September. Her

236 CHRONIC CONSTIPATION.

family physician has recently informed me that she is now pregnant and is in good condition, free from constipation and with but little nausea.

Case No. 18.

Mrs. R., age thirty-five, was referred to us through the courtesy of Dr. R. Dupont. The patient was in the third month of pregnancy. She had had three miscarriages and feared greatly that her pregnancy would again terminate in the same way. She suffered from severe constipation attended with considerable pain in the lower portion of the abdomen, and with much nausea and vomiting. She suffered from the same conditions during each pregnancy. It was only after the use of drastic cathartics and copious enemata that a bowel movement was obtained.

Examination revealed much venous congestion in the hemorrhoidal plexus and the sigmoid loaded with feces. Her tongue was heavily coated, the urine contained indican and excess of urates. Sp. gr. 1025, and had a very high color.

Rectal tampons were used on alternate days for two weeks, then at longer intervals. Cathartics and enemata were not required after the first treatment, and were discontinued. After a month's treatment

the patient's bowels were in excellent condition, moving regularly each day. Much of the pain had gone and the congestion of the rectal mucous membrane had entirely disappeared. However, the patient still suffered a good deal from nausea and vomiting. Some inflammation and erosion of the cervix was discovered. Local applications were recommended and given by the family physician. These were followed by the entire relief of the gastric neurosis.

From the patient's description of her symptoms during former pregnancies, it seems very probable that her present pregnancy would have run the same unfortunate course and terminated in miscarriage had not her constipation and the condition of her lower bowel been relieved. Somewhat similar results have been obtained in other cases of pregnancy complicated by constipation. However the nausea and vomiting were not relieved in any of the cases as markedly as we had anticipated, although in some of them there was a noticeable amelioration of the gastric symptoms.

Case No. 19.

Mrs. A. P., age thirty-one years. Was referred to us by Dr. Angus McLean in August, 1906.

The patient has one child now 6 years of age. Three years ago she had a miscarriage at the fourth month of pregnancy. When she consulted us her appetite was poor, her tongue coated, and she complained of much distress from gas in the stomach and bowels. She was afflicted with a very stubborn constipation of many years standing, and the condition had been more troublesome since her miscarriage. During the past year both cathartic medication and aqueous enemata were necessary to obtain a movement.

The patient was in a very nervous condition; when questioned about her symptoms she could not restrain her tears. She suffered much from billious headaches; at times there was considerable clear mucus in the stool, but fecal analysis failed to reveal any undigested food. The coloring matter was normal, the odor was offensive. This patient had lost considerable flesh; at the age of twenty she weighed between one hundred and twenty and one hundred and twenty-five pounds, whereas for the last year or so her weight has been between one hundred and one hundred and ten pounds.

There is, therefore, in this case some of the characteristic symptoms of auto-intoxication—the derangement of the nervous system is very char-

acteristic—the headaches, restlessness and general neuropsychic weakening. The skin, while showing no eruption, was sallow and digestion was poor. Emaciation is one of the most common signs of a chronic toxemia.

Treatment—The diet was made to exclude meat, milk and eggs. This was done to meet the indications just described. The diet contained vegetables, fruits, soups, broths, tea, coffee, cocoa, bacon, butter, bread, cereals, etc. Rectal tampons were used every day for seven days and then at lengthening intervals. Three ounces of olive oil was prescribed to be injected into the rectum at bedtime and to be retained until morning. At the beginning, three grains of salol was prescribed before meals for a period of two weeks. The patient came under treatment August 8, and was dismissed August 29. She remained in good condition for six months, at which time she left the city and we have been unable to learn of her further history. During the six months while under observation the bowels were regular and her appetite had improved. She was not entirely free from headaches, but was much improved in this respect, and she claimed to be much less nervous. There was a slight gain in weight.

Case No. 20.

Mrs. D. D., age thirty-five years. Never became pregnant. In 1898 we operated upon this patient for double pyosalpynx. Both tubes and ovaries being badly diseased, were removed. Constipation had existed since childhood. At times her appetite and digestion seemed to be pretty good, but there were frequent attacks of acute indigestion with vomiting and headaches. The patient was very nervous, suffering from insomnia and irritable temper. She seemed to be well nourished. Her habits were not conducive to good health, her meals were irregular, and she habitually ate to excess. At times she indulged too freely in alcoholic beverages.

Vaginal examination revealed that the uterus was in good position but was nearly immoveable. There were evidently some very dense adhesions. Attempts to move the uterus from side to side caused pain. Proctoscopic examination also produced pain.

Advice was given as to certain necessary changes in diet, but we are convinced that the instructions were never followed. Rectal tampons were used for about two weeks, but little or no benefit was obtained, and their insertion was quite pain-

ful. The use of rectal tampons was discontinued and liquid albalene in two dram doses twice a day was ordered. In addition to this she is compelled to resort to cathartic medication.

Case No. 21.

Mr. J. D. M. Age 38 years, was referred to us by Dr. J. V. White in 1904. Occupation a lawyer. He had worked very hard for several years, allowing himself little or no respite either for rest or recreation. In 1902 his appetite began to fail and he had considerable distress in his stomach; he also became constipated at this time.

Treatments were given by gastroenterologists at that time, but failed to give him any relief, so in the autumn of that year he was compelled to give up his work. He went with some friends to a camp in the woods of Northern Michigan, where in the course of a month he was greatly improved. In fact, he stated that he had completely recovered from his stomach trouble and was able to sleep well. However, his bowels continued to be constipated, and for temporary relief he had used a great deal of cathartic medication for two years, but the condition was becoming more stubborn. A proctoscopic

examination revealed nothing abnormal in rectum.

This patient was instructed to drink a glass of cold water before breakfast each morning, and after breakfast he was to devote an hour or longer, if necessary, to the proper functioning of the bowels, and this was to be done to the exclusion of all engrossing affairs. All medication was discontinued and the quantity of fruits in his diet was increased. Rectal tampons were inserted on January 4, 10 and February 6. We were able to keep track of this patient and his condition for over a year and during this time his bowels remained regular and no cathartics were necessary.

Overwork and the disregard of the demands of his organism were active causes of the constipation, which was aggravated by the continued cathartic medication. The common history of all these cases is that after the active causes are removed the constipation continues. The explanation is that there has been an atony of the intestinal musculature and an agent to be effective must be applied directly to the relief of the condition.

Case No. 22.

Mrs. B. B., age 30 years, was referred to us for

the relief of chronic constipation in January, 1903. She had one child born in 1901. The delivery was very difficult and instruments were used, resulting in a complete laceration. This was not repaired for some time and it was followed by a fistula in ano. An operation was performed in New York for the relief of the fistula: this was successful.

We found upon examination that there was some scar tissue in the anal mucosa, with much tenderness and contraction. She complained that defecation was very painful. Up to the time of her confinement she had never been constipated, and otherwise the patient was in a healthy condition. An operation to dilate the sphincters with excision of the scar tissue was advised, but was postponed. In the meantime gradual dilatation on alternate days was accomplished with great temporary relief of the constipation and of the painful defecation.

Case No. 23.

Mr. C. Y. B., age 43 years, by occupation a fireman in a large factory. This patient had suffered from an obstinate constipation for four or five years. His appetite was poor, and he had almost constant headaches; his skin and conjunctiva were jaundiced; he complained of pain in the small of

the back, and when his bowels became loaded with feces he also experienced pain and tenderness in the region of the appendix.

In 1896 he had an attack of acute appendicitis, and at that time his bowels were constipated to such an extent that extraordinary means, high enemata, etc., had to be used to obtain relief. He had lost twenty-five pounds in the last five years. His occupation required considerable night work and his sleep for the most part was obtained during the day.

Proctoscopic examination revealed a large amount of dark hardened fecal material above the rectal valves. The sphincters were normal and there was no evidence of inflammation or congestion in the rectum or sigmoid. The most obvious part of the treatment was to regulate his diet, hours of sleep, work and rest; but it was impossible to make the necessary changes.

Rectal tampons were used on November 21, 1903, and on alternate days for three weeks and then at longer intervals for two weeks. At the end of the first week an enema was necessary, although there were small movements each day. After that the bowels moved regularly and sufficiently. The constipation recurred in about one year, and we

have not treated him since. We recently learned that he had to resort to the use of cathartics.

Case No. 24.

Mr. W. A. A., age 35 years, consulted us for the relief of weakness and general debility. His occupation was a street car conductor. He was much emaciated, suffered much from the cold, appetite was poor and bowels constipated. This patient had a chronic cough which was easily and frequently aggravated. The constipation had existed for many years. Several years before he consulted us, he had an attack of diarrhea, and since then he had to resort to very severe cathartics as well as copious enemata to obtain a bowel movement; this produced tenderness and pain in the abdomen, great weakness and occasionally profuse sweating.

A proctoscopic examination revealed the mucosa to be in a healthy condition. The rectal valves were very large and were in close proximity to each other; it being evident that a little pressure from above would make them lie one upon the other. Accordingly, straining and the descent of feces would bring about a veritable diaphragm formed by the rectal valves.

Rectal valvotomy was performed on this patient

on August 28, 1902, at Harper Hospital, and the patient kept in bed ten days. On the second day after the operation the bowels moved and thereafter there were regular movement for several months, when the patient was lost track of.

The patient's general condition improved very much during the time he was under our observation. This was partly due to the regular diet and the rest in bed, but was undoubtedly dependent to some extent upon the improved condition of the bowels.

Case No. 25.

Mr. R. W. H., age 33 years, by occupation a manufacturer. He consulted us in September of 1904 for the relief of chronic constipation. He was well nourished, regular in his habits and had a good appetite, but was compelled to resort to some laxative medication three or four times a week.

Rectal tampons, six in all were used on alternate days. All cathartic medication was discontinued from the first and after the first tampon, daily small hardened bowel movements began. At the end of ten days the passages were normal and regular. We have had an opportunity to keep this case under observation up to the present time and there has been no recurrence of the constipation.

AUTHORS REFERRED TO.

	Page.
Arniell	102
Auerbach	47
Beck	94
Boucharde	202, 206, 208, 191 193
Bretonneou	65
Brunton	206
Curschman	102
Comadi	182 183
Delafield and Prudden	179
Ehrmann	84
Einhorn	166
Engelman	50
Fleiner	166
Fleischer	54, 68, 70 72
Flexner	189
Gant	46, 95 177
Glenard	101
Hemmeter	35, 68, 77, 84, 88, 95, 117, 123, 127 166
Hirschman	177
Herter	188, 189, 193, 196, 205 207
Houston	44
Hutchinson	92
Illoway	55
Kelly	93 143
Kurpjewelt	182
Lane	29
Lauder	206
Leichtenstern	130
Loeb	49
Longyear	52
MacCallum	33

Martin	40
Meissner	47
Metchinkoff	182
Mall	48
Novy	191
Nothnagel.....	35, 47, 57, 58, 61, 62, 63, 84, 89, 106, 128, 156
Nuttall	189
O'Byrne	76
Oster	94
Pasteur	182
Pennington	46 177
Reinsinger	94
Selmi	191
Smith	189
Spencer	38 39
Turck	187
Tuttle	94 174
Troves	106 107
Trousseau	71 72
Vaughan	191
Virchow	91, 106 142
Walker	94
Welch	189

INDEX.

A.

	Page
Acute Angulation	107
Acute Coloptosis	50
Adhesions of the Bowel	107
Adhesions of the Peritoneum.....	105
Anal Fissure	95
Anal Sphincter	42 172
Anascope	133
Anastomosis	47
Anemia	95
Angulation	51 103
Angulation, Acute	107
Ani	52
Ani Muscle	42
Anus, moisture about	134
Antiperistalsis	28
Atony	59
Atony in the Colon	64
Atony, degree of	65
Atony, intestinal causes of	70 71
Atony of intestine, muscular.....	61
Atony, location of	64
Atony in the rectum	64 65
Appendicitis	143
Appendicitis, Catarrhal	92
Atrophy of the Sphincter	134 172
Auto-Intoxication	173 179

B.

Bacillus Aerogenes Capsulatus	189
-------------------------------------	-----

250 CHRONIC CONSTIPATION.

Bacillus Coli Communis	185
Bacteria, intestinal	181
Ballooning of the rectum	122
Biliousness	180
Blood in feces	130
Blood supply of colon	46
Blood supply of rectum	46
Bodily inactivity	77
Bowel, acidity or gas in	35
Bowel, adhesions	107
Bowel, Cancer in	95
Bowel, density of contents	28
Bowel, expulsion of contents	28
Bowel, evacuations	88
Bowel, fat in	72
Bowel, fat in	72
Bowel, gasses in	156
Bowel, irritants	32
Bowel, movements in chronic constipation	54
Bowel, normal evacuations of	26
Bowel, obstruction of	98
Bowel, one movement in 24 hours	29
Bowel, regulation of	165
Bowel, propelling of the contents	30
Bowel, sluggishness of	57
Bowel, stricture of	35
Bowel, The large	25
Breakfast	157

C.

Cachexia	95
Catarrhal inflammation, Treatment of	175
Cathartics	34
Catharsis hypodermically	33
Catharsis, ill-advised use of	78
Catharsis, evil effects of	78
Causes of Chronic Constipation	59
Cecum	26
Cecum, inflammation of	92
Cell protoplasm	39
Centers, motor	33
Chancroidal ulcers	104
Chemical examination of feces	131
Chemical irritants, effect of	38
Chemical irritations	35, 38, 42, 70, 148
Chronic constipation, definition of	53, 56

INDEX.

251

Chronic constipation, immediate cause of.....	59
Chronic colitis	88, 141, 164
"Chronicity"	63
"Chronicity" obstipation	51
Circulation, derangement of.....	110
Clinical cases	216-246
Contractile tissues	40
Cold Water	155
Coloptosis	102
Colitis	164
Colitis, chronic	88, 141
Colonic irrigation	166
Colonic musculature	26
Colon	29, 50, 52
Colon, Atony in	64
Colon, Blood supply of	46
Colon, Caliber of	31
Colon, Inflammation of	108
Colon, Misplacement of	101
Colon, Musculature	27
Colon, Physiology of	32
Colon, Stimulation	36
Coloptosis, Acute	50
Color of feces	125
Concretions, intestinal	130
Concretions, stony	130
Contraction	29
Contraction, Experiments in	37
Contraction of abdominal muscles	37
Contraction of the sphincter	99
Contraction, peristaltic	34-146
Contraction, wave like	30
Consistency of feces	125
Constipation, spastic	167
Coprostasis	141-142

D.

Debility from auto-intoxication	211
Defect in diet	72
Degree of atomy	65
Derangement of circulation	110
Distention, Importance of	39
Distention, Intestinal	147
Diagnosis in auto-intoxication	210
Diagnosis, methods of.....	115
Diet	71
Diet, faulty	54, 200

252 CHRONIC CONSTIPATION.

Diet, improper	68
Diets, defects in	72
Dietetics	153
Digestive juices	200
Dilation of the Sphincter	173
Dislocation of the Sphincter	172
Diverticula	109
Dyspepsia	86

E.

Endogenous poisons	179
Enervation of the Intestines	47
Enteroptosis	50
Evacuations, normal	26
Examination, microscopic	131
Examination of feces	123
Examination of the Rectum	132
Examination, physical	116
Examination, rectal, positions for	133
External Anal Sphincter	42
Exogenous poisons	179

F.

Fats	156
Fats in the bowel	72
Faulty diet	200
Fecal impaction	66
Fecal matter, retention of	64
Fecal tumor	117
Fecal vomiting	202
Feces	68
Feces, blood in	130
Feces, chemical examination of	130
Feces, color of	125
Feces, consistency of	125
Feces, examination of	123
Feces, hardened	91
Feces, in lower bowel	42
Feces, large quantities	50
Feces, liquid	91
Feces, odor of	125
Feces, pus in	130
Feces, retention of	64
Feces, quantity per diem	123
Fermentation	195
Fermentation in the bowel	79
Fistula	138

Flora, intestinal	181
Fruits, laxative	156
Functions of the valves.....	46

G.

Causes in the bowel.....	156
Germes in food.....	184
Gonorrheal ulcers	104
Green vegetables	157
Gut, anatomy of.....	28

H.

Headache	213
Hemorrhoids	138
Hepatic torpor	213
How to use tampons.....	149
Hypertrophy of the prostate.....	104
Hypertrophy of the Sphincter.....	172

I.

Ill-advised use of cathartics.....	78
Ileo-cecal valve	26
Ileo-cecal valve, formation of.....	27
Ileum	26
Indol	193
Inhibitory impressions	47
Inflammation	142
Inflammation of the cecum.....	92
Inflammation of the colon.....	108
Information, source of.....	116
Internal anal sphincter.....	42
Intestine, kinks of.....	107
Intestine, size of.....	27
Intestinal bacteria	181
Intestinal concretions	130
Intestinal destentions	147
Intestinal flora	181
Intestinal irritants	48
Intestinal muscle, failure of.....	59
Intestinal muscular atony, causes of.....	70, 71
Intestinal muscular atony.....	61
Intestinal neoplasm	88
Intestinal neurosis	84
Intestinal peristalsis	31
Intra-abdominal pressure	168
Irritants, chemical	25, 28, 70, 148
Irritants of bowel.....	32

254 CHRONIC CONSTIPATION.

Irrigation, colonic	166
Irritability of the sphincter.....	172

J.

Juices, digestive	200
-------------------------	-----

K.

Kidney, floating	52, 104
Kinks of intestine.....	107

L.

Levator ani muscle	43
Laxative fruits	156

M.

Malaise	213
Malignant growths	138
Massage	168
Massage of the valves.....	176
Mastication	155
Meats	162
Mechanical disturbance	42
Mechanical stimulation in the colon.....	36
Mental diseases	113
Mental symptoms	212
Mental work as a cause of constipation.....	75
Mesasigmoid	50
Mesenteritis	108
Mesocolon	50
Microscopic examination	131
Micro-organisms	188
Mind, supremacy of.....	67
Misplacement of the colon.....	101
Moisture about the anus.....	134
Motor centers	33
Motor impressions	47
Motor stimuli	33
Mucus in stool.....	127
Mucosa, rectal	137
Muscle, ani levator.....	43
Muscle, stretching	151
Muscular tissue	41
Muscular tone	30
Musculature, colonic	26
Musculature of the colon.....	27

N.

Nervous diseases	113
------------------------	-----

O.

Obstipation	97
Obstipation, chronic	51
Obstipation, treatment of.....	173
Obstruction of the bowel.....	98
Oils	156
Olive oil	162
Odor of feces	125
Ovary, prolapsed	104

P.

Parietal peritoneum	109
Percussion	50
Peristaltic contraction	27, 34, 146
Peristaltic meal	117
Peristaltic stimuli, physiology of.....	55
Peristaltic wave	31
Peristalsis	37
Peristalsis, abnormal	35
Peristalsis, stimulus of.....	38
Peritoneum, adhesions of.....	105
Peritoneum, parietal	109
Peritonitis	94, 111
Physiology of colon.....	32
Physical examination	116
Poisons	179
Poisons, Endogenous	179
Poisons, Exogenous	179
Poisons found in the intestines.....	190
Polypl	138
Polyps	96
Positions for rectal examinations.....	133
Post-mortem findings	90
Portal vein	28
Pressure, intra-abdominal	168
Proctitis	138
Prostate, hypertrophy of.....	104
Proctoscope	44, 136
Protozoa	39
Ptomaine	191
Ptoxis	101
Ptoxis, acquired	102
Purgative, failure of.....	49
Pus in feces	130
Putrefaction	197
Putrefaction in the bowel.....	70

R.

Rectal examination	132
Rectal examination, position for.....	133
Rectal Mucosa	137
Rectal Tampon	122, 148
Rectal Tampon, therapeutics of.....	148
Rectal Valves	42, 100, 137
Rectum	50, 52
Rectum, Atony in.....	64, 65
Rectum, ballooning of.....	122
Rectum, blood supply of.....	46
Rectoscope	133
Regulation of the bowels.....	165

S.

Scybala	126
Section of the valves.....	176
Sick headache	180
Sigmoid	50
Size of tampons.....	149
Skin	213
Spastic constipation	167
Sphincter	26
Sphincter, anal	42, 172
Sphincter, Atrophy of.....	172
Sphincter, contraction of.....	99
Sphincter, dilatation of.....	173
Sphincter, dislocation of.....	172
Sphincter, Hypertrophy of.....	172
Sphincter, Irritability of.....	172
Stimulation in the colon, mechanical.....	36
Stimuli motor	33
Stimuli, origin of.....	32
Stimulus of peristalsis.....	38
Stony concretions	130
Stools, infrequency of.....	54
Stretching, the physiologic stimulus.....	60
Stretching muscles	151
Stricture	95
Stricture, indication of.....	126
Symptoms in auto-intoxication.....	210
Sympathetic system	47
Syphilis	104

T.

Tampon, rectal	122, 167
Tampons, how to use.....	149

Tampons, material for.....	148
Tampons, size of.....	149
Therapeutic agents	173
Therapeutics	148
Therapeutics of rectal tampons.....	148
Tissues, contractile	40
Tone, definition of.....	30
Tone, diseases that impair.....	84
Tone, lack of.....	59
Tone, muscle	30
Toxemia	209
Transverse mesocolon	50
Treatment of auto-intoxication.....	214
Treatment of catarrhal inflammation.....	175
Treatment of obstipation	173
Tubercular ulcers	104
Tumors	138
Tumors, fecal	117
Typhlitis	93

U.

Ulceration	95
Uterus, r troflexed	104

V.

Valve, anatomy of	26
Vacuole	40
Valve, ileo-cecal	26
Valves, function of.....	46
Valves, location of.....	45
Valves, massage of.....	176
Valves, rectal	43, 100, 137
Valves, Sections of.....	176
Volvulus	108
Vegetable carmine	39
Vegetables, green	157
Vein, portal	28
Vomiting, fecal	202

W.

Water	73, 153
Water, cold	155
Water in diet.....	155
Wave, peristaltic	21
Worry as a cause of constipation.....	75



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